

## SUPPLEMENT.

# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

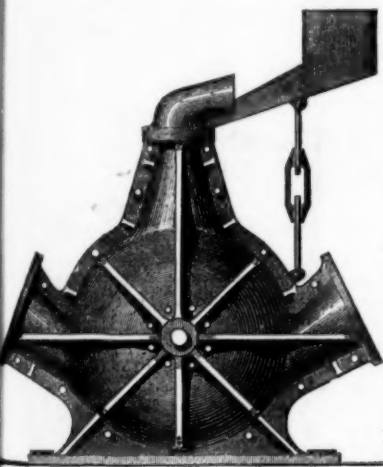
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No. 2423.—VOL. LII.

LONDON, SATURDAY, JANUARY 28, 1882.

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Rio de Janeiro Exhibition, 1875.  
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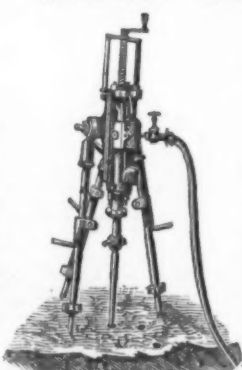
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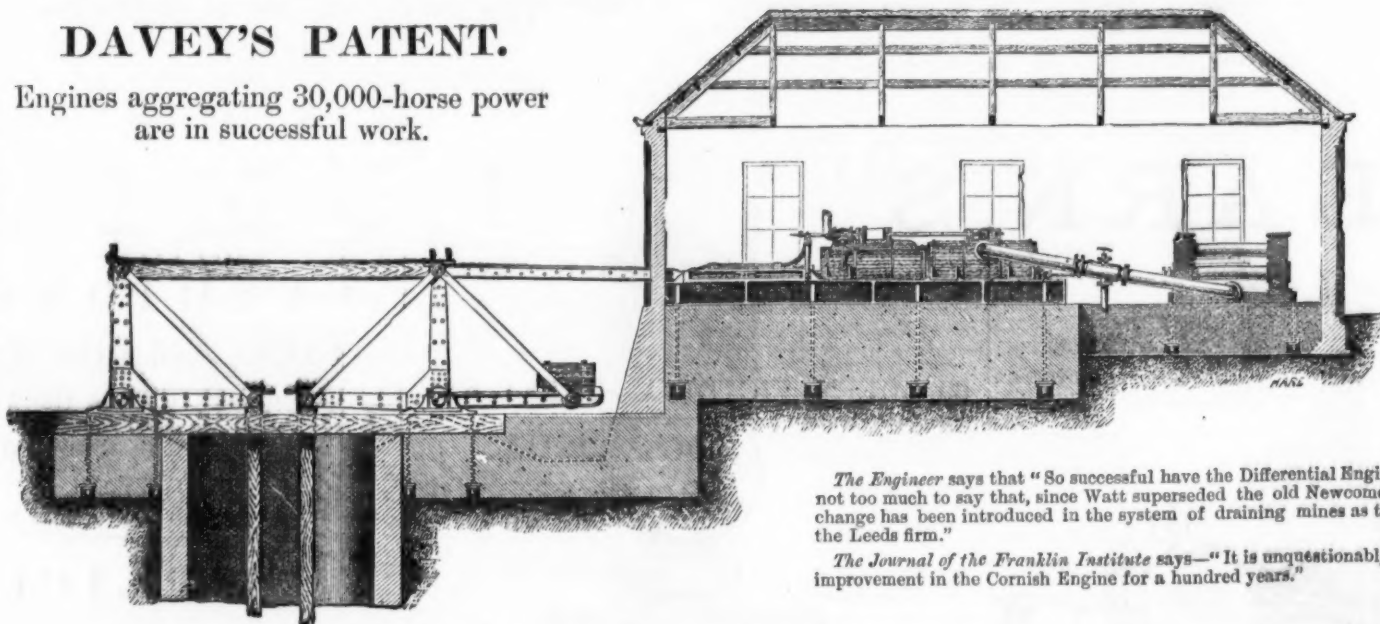
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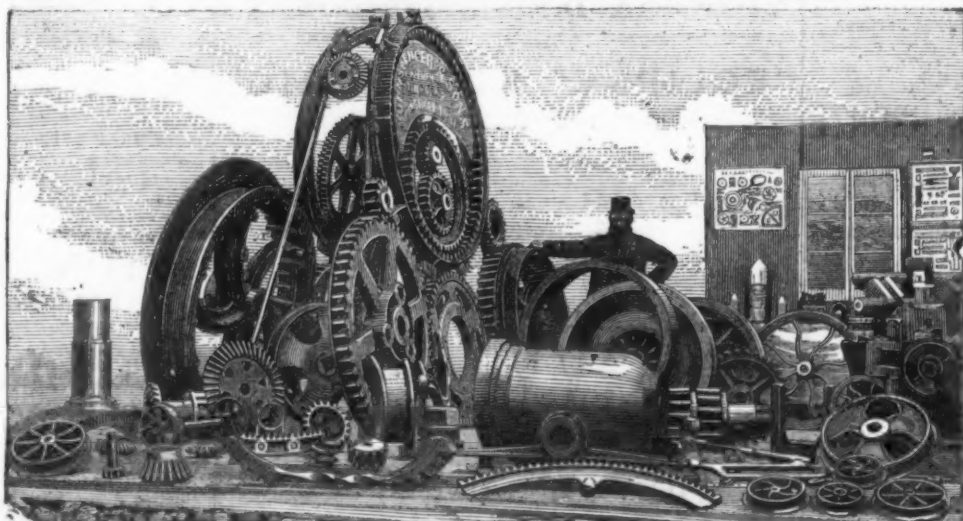
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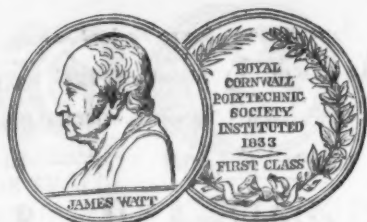
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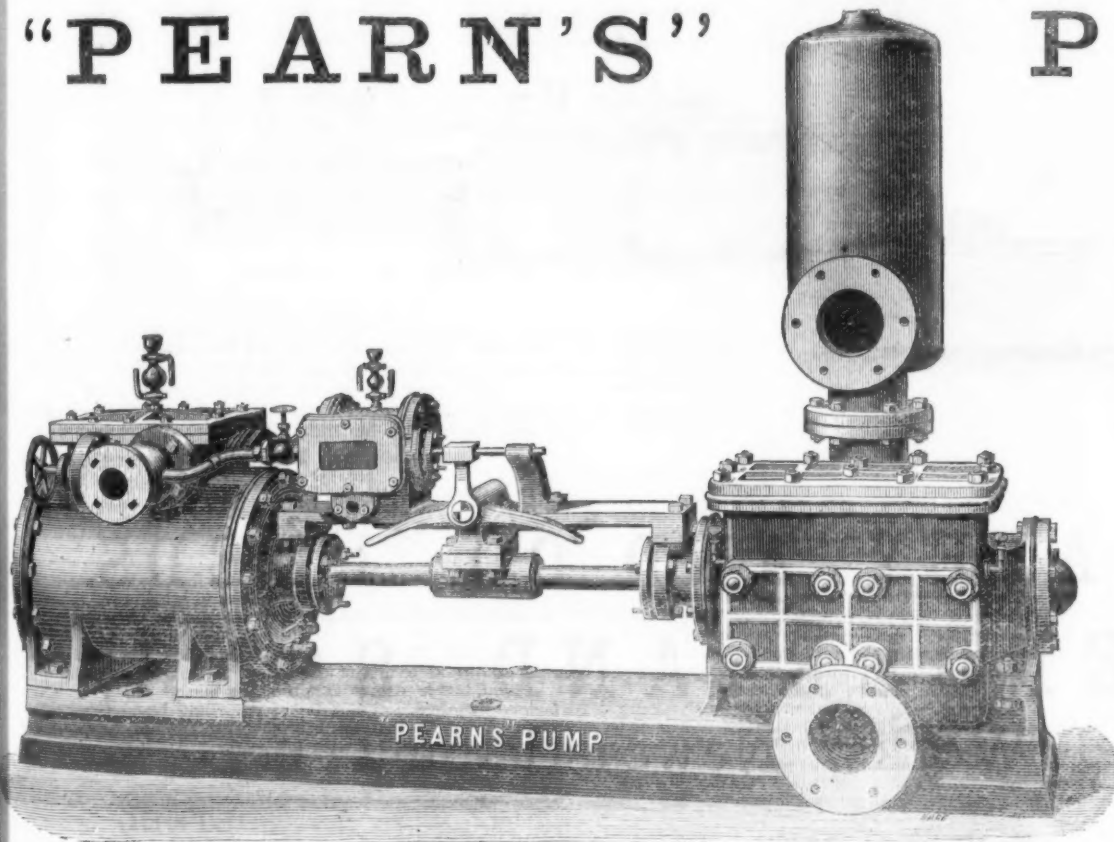
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Length of Stroke .....	9 in.	9 in.	9 in.	9 in.	12 in.	12 in.	12 in.	12 in.	12 in.	18 in.	24 in.	24 in.	24 in.	24 in.
Content, Gallons per Hour .....	950	1500	2160	2940	3840	4860	6000	8640	11590	15360	19440	24000	34650	46360
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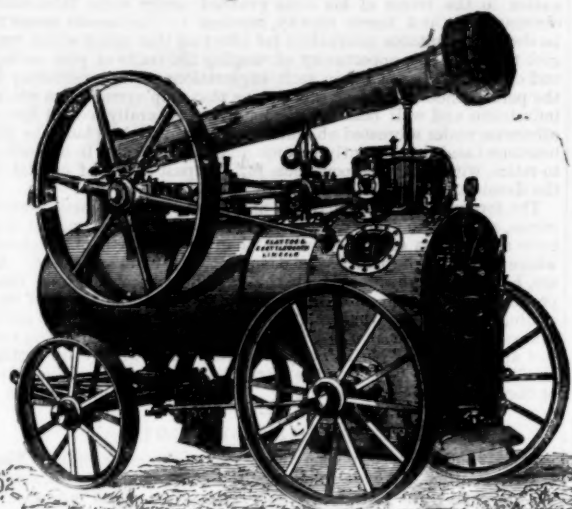
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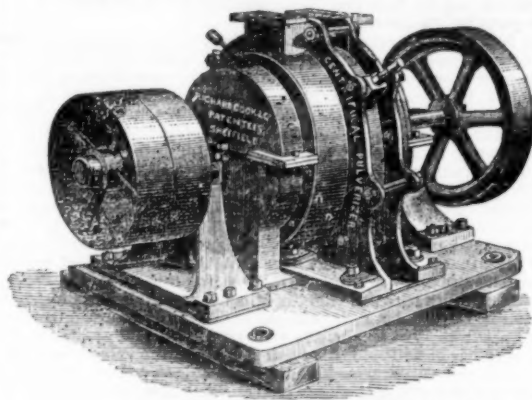


MELBOURNE—1881.



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**Patent Centrifugal Pulveriser,**

(Two tons per hour with 5 horse-power actual.)



THE ONLY GUARANTEED MACHINE FOR

**GOLD QUARTZ.**

This mill consists of a circular iron casing, the section being elliptical in form, and is fixed vertically on a firm bed or foundation plate, a shaft runs through the centre of the casing on which is keyed a series of arms, in the extremities of which revolve two more slightly oblong iron rollers, which, when put in motion, fly off from the centre and run upon the interior periphery of a casing, and by centrifugal force crush and pulverise the article under treatment.

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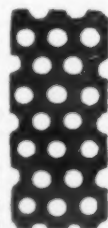
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## Original Correspondence.

## CROWN MINING LANDS.

SIR,—A vacancy having occurred in the office of Commissioner of Woods and Forests through the decease of the Hon. James K. Howard, it is now a good opportunity for those interested in mining to endeavour to obtain some reasonable concessions from that department. One member, Mr. Pugh, was 'unable through pressure of business in Parliament last Session to move for a Royal Commission to inquire into this matter; and to show how general is the feeling against the present policy of the Woods and Forests it may be remarked that at the last general election the candidates on both sides pledged themselves to move for a Royal Commission. The new Commissioner, whoever he may be, must be prepared to alter the past policy of his department, and as the late Commissioner was doubtless guided entirely by his subordinates, it is to be hoped that the new Commissioner will be guided by his own common sense in the matter. As a petition is now being drawn up I will not trespass further on your space than to say that I hope anyone having any experience in the matter will ventilate the same in the *Mining Journal*.

## LEAD ORE ROYALTIES.

SIR,—Among the several industries in the North of England giving employment to native populations may be ranked that of lead mining, which has immemorially been carried on by numerous spirited adventurers, among whom may be found the oldest and largest lead producers of the kingdom. The people of these mining dales are not of migratory character, but rank among the most intelligent, religious, and well-conducted of the inhabitants of the North, and it has often been a subject of remark that their employers have in times past stood as foremost among the capitalists of the country in the promotion of education, and of every good object for the welfare of those engaged in their service. The mining adventurers and people are not the only parties to whom the industry has been a benefit; it being a noteworthy fact that the lords of the mines in the enjoyment of manorial rights (not conceded by the Crown in other European States where reservations have been made for the welfare of the people) have been deriving immense revenues therefrom without any expenditure on their part, their portion of the gross produce of the mines either delivered in a dressed merchantable condition or a pecuniary commutation in lieu thereof being fixed and certain, without regard to the adventure being profitable or unprofitable to their several lessees at whose cost and risk the operations are carried on, and to use the homely but striking phrase of one of the sagacious working miners—"It is a fact that every fifth man of us works at our employers' sole cost for the benefit of the lord, who does nothing besides receiving his dues." This remark being applicable to the period nearly half a century ago, when 1-5th royalty in kind was the universal render, but still remaining applicable to any thereafter mitigated proportion. Since that time the enormous renders to the lords have undergone abatement, but it is understood that in some of the mining fields as high as 1-7th and 1-8th royalty on opened mines is still exacted, and even to the extent of 1-9th on new explorations, and these alike connected with a burthen on the lessee of parochial rates created and assessed under the "Rating Act of 1874" on the dues or rent of the preceding year.

It may excite surprise why the lessees of the mines have been found willing to enter into engagements involving such heavy outgoings to their lessors, and the only reasonable explanation appears to be that the ores were in bygone periods comparatively easy of access, and the then privilege of economically winning them yielded adequate profits, and that the lead mining in the dales of the North of England has gradually needed the advancement of long underground adits or levels for the exploration and winning of the veins, and of costly measures for working below free water level, and that from time to time on the renewal of their leases it has been found that costly measures of this description have not realised their objects, and to retire therefrom under the general absence of any provision for tenant right or compensation for incompleted or unexecuted improvements would necessitate the loss of the whole capital previously sunk, and in other cases the opened ore has not been exhausted. And thus the lessees have virtually been at the mercy and goodwill of their lessors. And it is well known such has been the fascination of hope in the breast of a mining adventurer that he will cling to the object of his research in the face of difficulties appearing to others insurmountable.

The decennial average price of lead per ton may be stated as from the year—

1800 to 1810	£27 0
1810 to 1820	23 0
1820 to 1830	21 0
1830 to 1840	17 10*
1840 to 1850	18 0*
1850 to 1860	22 0
1860 to 1870	22 0
1870 to 1880	21 0

\* In the course of these 20 years occurred some very low prices, when great privations were undergone by the working miners thrown out of employment consequent upon the losses of adventurers.

And so long as the market price fluctuated between 20*l.* and 25*l.* per ton, and the deemed most valuable ore deposits remained virgin and available for selection, there may have been some though questionable justification for the onerous engagements between lessors and lessees. But now when during the past four years the price has been at and under 15*l.* per ton, and there exists too strong reason to fear that such low rate may prevail in the future, and under the exhaustion and curtailment of first-class mining opportunities it has become essentially necessary that the serious consideration of both lords and adventurers should be given to the subject. And failing their arriving at mutually satisfactory arrangements then that the more immediate inhabitants of these mining dales and the public in general who feel, or ought to feel, an interest in the welfare of a national industry and of a labouring population attached to the homes of their fathers, and now being gradually expatriated, should enter into the arena with a view to general Parliamentary inquiry and action.

In the *Mining Journal* of June 25, a quotation is made from Iron that the Russian Government intend to let or sell their silver, lead, and zinc mines in the Caucasus, where railway exists, at a nominal rental or price "for the benefit of the country and its inhabitants," and with the example of such a beneficent motive it may be fairly looked for that the wealthy proprietors of our home mining fields will not be disregarding of the needs of their own country. The questions very naturally arise—first, to what cause is the depreciation in the value of metals to be attributed, and is there a reasonable prospect of its removal under the general revival of trade throughout the kingdom?—Secondly, if largely attributable to the foreign production of lead in connection with the precious metals, and comparative freedom from royalty, is such competing production likely to fall off, or on the contrary more probably be enhanced by the increasing facilities afforded from recent and progressing railways to the sources of the ore raisings and thence to the seaboard, whence its shipment either to England or other spheres for its utilisation has now become comparatively easy and inexpensive.—Thirdly, is the maintenance of our home industry compatible with the existing burden of lord's dues, which are as already stated rendered regardless of the fact whether the mine is profitable or unprofitable; and ought it to be a subject of Parliamentary inquiry whether the existing relations between lessors and lessees have been based on such equitable principles as are calculated to fairly meet the exigencies of the present times, and if not how are they to be so modified as to obviate as far as practicable the ultimate destruction of a national source of wealth and employment to the people of the country? Would not a render on actual profits be fitting, or a sliding scale of royalty based on or proportioned to each year's or other periodical average price of lead whereunder the render would fluctuate with the rise or fall in the market value of the produce affecting the lessees' profits, or how otherwise, so as a correct equitable adjustment be affected?

In the case of old established mining fields wherein the lessees,

unaided by the lessors, have invested enormous capital in exploration and development and valuable machinery, a reduction of from 1-3rd to 1-4th in the average price of lead must either sweep away the realisation of similar to past reasonable profits, or convert such into an inordinate loss; and when the lessor declines any voluntary mitigation in the terms of his lease granted under more favourable circumstances at a heavy royalty, recourse to Parliament seems to be the only equitable alternative for effecting that relief which may give the lessee an opportunity of reaping the fruits of past outlay, and continuing to engage in such explorations as are necessary to the permanence of mining, and to give that employment to a native industrious and well conducted population naturally looked for, or otherwise under a created obligation of tenant right place the disheartened and consequently become undesirable lessee in a position to retire, with a fair compensation for his past outlay of capital in the development of the lessors' mining field.

The foregoing remarks may be applicable to other metalliferous mines, and also to every part of the United Kingdom, though it may be to a much less extent elsewhere than in the North of England, where the lead ore royalties are comparatively more excessive. All are, however, alike affected by the current market price of their produce. These thoughts are submitted to the consideration of both mining lords and adventurers, as well as others who may either sympathise or differ in opinion with the views expressed. The subject appears to the writer very important, and worthy of further candid public discussion on the part of those who may either agree or disagree in sentiment with a

VETERAN MINER.

## THE FUTURE OF GOLD.

SIR,—I have only just seen the September number of the *Nineteenth Century*, in which there is an article from Mr. Emile de Laveleye, on "The Future of Gold." The article, which is admirable in many respects, is misleading in others, and is calculated to do an injustice to the mining industry of some of the richest gold producing countries in the world. Passing over what may be termed the theoretical portion of Mr. de Laveleye's article, I will confine myself to what may be considered the practical part, or the probable future production of the precious metal in those countries in which I have spent a great deal of my time, either in conducting the operations of successful gold mining or exploring in search of new mines.

In speaking of Australia Mr. de Laveleye says, "In 1856 it reached its maximum, about 12,000,000*l.* sterling." As a fact, duty was paid in that year on gold valued at over 14,000,000*l.* sterling, and it was generally believed that near 50 per cent. was taken out of the country without paying duty. This idea was confirmed in various ways, notably by the divers after the unfortunate wreck of the *Royal Charter*. It is by no means surprising to find that Australia produced such large quantities of gold in so short a time in the early days of the diggings, when we consider that in many instances it could be had almost for picking up and in the majority of cases it could be got for a mere scratching of the surface. Although such large quantities of gold were found in such a short time the permanency of the Australian gold fields were not thoroughly established until the veins were proved to be of a permanent character. Individual diggers without any scientific knowledge or capital could unearth the alluvial deposits of gold; but to work the veins successfully it requires both. It is, therefore, obvious that as soon as the superficial deposits of gold were removed the yield would fall off in proportion, but the supply obtained from the veins would be permanent and lasting.

The present annual supply of gold from Australia amounts to about 8,000,000*l.* sterling, but if companies continue to be formed there for the development of the gold veins in the future at the same rate as during the last 12 months the annual yield of gold in 1884 cannot fail to reach 10,000,000*l.* sterling, an amount the country is capable of supplying for a long time to come. From carefully prepared statistics, and the best information I was able to gather while in the United States in 1875, the quantity of gold which may be safely reckoned upon annually from that country is near 8,000,000*l.* sterling. Mr. de Laveleye appears to have been very ill advised with regard to Brazil. It is well known that a very large quantity of gold had been sent to Portugal from Brazil at a much earlier date, although the first authentic records were in 1713, just after the discovery of the celebrated Villa Rica gold fields; and even those records can only be based on the amount of gold (one-fifth) received as royalty by the Government.

In Brazil, like all other countries where the duty is excessive, every conceivable means was resorted to for the purpose of cheating the Government, and a contraband trade was carried on on a gigantic scale. It is, therefore, utterly impossible to form a correct estimate of the actual quantity of gold taken out of Brazil. The auriferous formation of Brazil does not bear the remotest resemblance to the gold bearing formation of either Australia or California, and the alluvial deposits were by no means so extensive, but they were far richer, and, as Mr. de Laveleye truly remarks, "they were soon exhausted." But he goes on to remark, "The working of the veins was then commenced, but without profit." This statement is unfortunate, and contrary to fact, as may be proved by the records which are kept in the Government offices at Ouro Peto. Gold was first found in Brazil about the year 1690 (some say 1670). In 1730 the alluvial deposits were almost exhausted, and the working of the veins commenced, but not "without profit," as may be seen from the fact that from 1730 to 1780 the yield of gold was far greater than in any previous or following years, and many of the veins were so rich that they were apportioned off in claims of 8 ft. square, the Government taking one-fifth of all the gold raised. The Brazilians followed those rich veins down to water level (always a Brazilian stopping point), and with four or five exceptions they have remained unwrought to the present day. The Brazilians worked in the most primitive manner, using no mechanical appliances, and removing both water and stuff out of the mines on the heads of negroes (that is, whenever they attempted to remove a drop of water). But generally as each mine reached water it was abandoned, consequently in the year 1809 the Government royalty of one-fifth fell to 6000*l.* troy. About the year 1820 many of the mines had ceased to be profitable to the Brazilians solely through the want of skilled labour and mechanical appliances.

The part of Mr. de Laveleye's article which appears to be the most inaccurate, and at the same time the most easily proved, is in reference to the introduction of English capital into Brazil. He says (referring to 1820): "Since that date English capital has paid for the working of many mines, and notably those of Jacotinga and St. John del Rey, but in each case the money has been all or in great part lost." A more inaccurate statement I have seldom read, and I cannot allow it to remain uncorrected. A person reading the above would naturally suppose that Jacotinga was the name of some particular mine, whereas it is the name given by Brazilians to a particular geological formation, composed principally of iron ore, quartz, manganese, talc, and mica. In this formation thousands of mines have been profitably worked by Brazilians. The first mine held by an English company was in a Jacotinga formation. This mine was first worked by Brazilians in 1740, and successive proprietors amassed splendid fortunes; however, as soon as water was reached it ceased to be productive to the Brazilians, and the mine and estate of Gongo Soco was in 1825 sold to an Englishman for 800*l.*; it was shortly after sold to the Imperial Brazilian Mining Association for 80,000*l.* It paid a dividend in the second year after the English took it over, and notwithstanding the trouble experienced through imperfect machinery and bad drainage, it yielded a profit to the shareholders of 375,000*l.*, and paid to the Brazilian Government as royalty 310,000*l.* The management of the Gongo Soco was entrusted to a naval captain, and, as might have been expected, the mine collapsed, and buried a very rich vein of gold. I have no doubt that when proper machinery can be introduced into the country it will be re-opened at a good profit.

The Cata Branca Gold Mine (rock formation) was also worked at a good profit, but I have not the particulars at present, although I have seen them. The Pari, or Santa Barbara Gold Mining Company (office, Liverpool), started in 1863, is a rock mine, and pays the shareholders 25 per cent. per annum on their capital. If properly conducted this is a lasting mine. The Don Pedro North del Rey Gold

Mining Company, to which Mr. de Laveleye has particularly referred has its office in London. It is a Jacotinga formation, and was started in 1862. It took the company three years to re-open and explore some of the old Brazilian mines, but in the fourth year (1866) they paid the shareholders 100 per cent. on their capital. In 1867 they paid over 100 per cent. on their capital, which they repeated in 1868 and 1869. I have none of the statistics of this company beyond the latter date, but when I last saw the mine there was every appearance of it turning out splendid, although I am well aware that bad management is capable of ruining even this fine property.

The other Brazilian mine to which Mr. de Laveleye refers as belonging to an English company and of no value is the St. John del Rey. This company was first started in 1830 for the purpose of working some quartz veins near the village of the same name. They were not successful at first, and soon removed their staff and plant to Morro Velho. It was registered as a limited company in 1858, and up to 1877 paid in dividends 1,238,050*l.* Since 1877 it has paid about 50,000*l.* per annum, or 36 per cent. per annum on the capital of the company. They have a reserve fund of 50,000*l.*, and the machinery and plant unequalled by any gold mine in the world. The Brazilians did not work any of their mines to a greater depth than about 100 ft.; but the English company of the St. John del Rey have already worked the Morro Velho Mine to a vertical depth of over 1400 ft., and the line is far richer and more compact in the bottom now than at any previous period. There can be no question but that the Morro Velho Mine will last as long as mechanical appliances can be introduced to cope with it in depth, and if this mine is to be taken as a fair sample of the Brazilian gold veins their permanency is thoroughly established. There has been two or three failures of English companies established in Brazil, but the fault was not in the mines; it was in each case owing to incompetent management, or middlemen putting money into their pockets which ought to have been spent in the development of the mines. This was not done in the St. John del Rey, and under the management of Mr. J. N. Gordon, seconded by Mr. Thomas Treloar, it may be considered the model mine of the age.

From my knowledge of Brazil I believe there are hundreds of mines there equally as good as the St. John del Rey, and if conducted on the same principle would produce corresponding results. But if only 50 companies were at work throughout the whole of Brazil, each producing the same amount of gold as the St. John del Rey, the annual yield of gold would be about 10,000,000*l.* But this is far below what the country is capable of doing under favourable circumstances. The Brazilian rivers are also very rich in gold, and should the Government ever grant concessions to companies for diverting their course, the quantity of gold that may be raised from this source is beyond conception.

In speaking of mining in my country, as a profitable source of industry or otherwise, it is not fair to select any particular mine on which to base a calculation, because mining, like every other industry, has its blanks as well as its prizes, and success or failure may depend on a variety of causes. The question is has Brazilian mining, taken in the aggregate, been a profitable source of investment for English capital? I answer, most decidedly it has. Not only has every pound of the subscribed capital been returned to England, but it has been returned with 200 per cent. added; and this cannot be said of any other country in which English capital has been invested in mining. All the companies to which I have referred are so well known that the facts can easily be ascertained by applying at their offices in London and (in one case only) Liverpool. It will, therefore, be seen that Mr. de Laveleye's article is seriously misleading with regard to Brazil. I maintain that there is no reason to apprehend a falling off in our permanent gold supply if we only go systematically to work on the veins in those countries known to be rich in the precious metal; and that the discovery and exhaustion of alluvial deposits does not furnish sufficient data on which to base a calculation as to our future permanent supply of gold.

It may not be amiss to point out here that miners invariably search for gold only in its pure state; whereas it is to be found in as great a variety of form as any other metal. The celebrated Morro Velho, to which I have referred, is to all appearance a mass of pyrites; and the stone is so dense, and the gold so equally disseminated through the entire mass, that the greatest expert cannot discover any gold until the stuff has been pulverised, amalgamated, and passed through the retort.

"Phosphuret" of gold is to be found in many of the gold mines of Brazil; and in the Transvaal I have seen small veins, at least one third of which were composed of "sulphuret" of gold, which the diggers were washing away for the sake of getting the pure metal. If proper attention be given to the discovery of gold in forms different from its pure state, and the countries known to be rich in the precious metal are properly developed, I do not think we need be apprehensive of a falling off in our gold supply, more than that of any other metal.

Judging from my own experience and observation, I believe Brazil is capable of yielding 10,000,000*l.* sterling annually; Australia, 10,000,000*l.* annually; the United States about 8,000,000*l.* annually; and "South Africa" about 1,000,000*l.* annually. The latter estimate is, without doubt, the most problematical; but, after careful consideration, I cannot help thinking that when South Africa becomes better known it will be found that I have placed the estimate rather under than over the mark. THOS. COLLINGWOOD KITTO.

Kimberley, South Africa, Christmas Day.

## SOUTH INDIAN AND INDIAN GLENROCK AMALGAMATION.

SIR,—I quite agree with the comments of "W. W." in the *Journal* of Jan. 14, and hope that as at present arranged the proposed scheme may fall through. The mere fact of saving the salaries, &c., of a manager, reduction officer, and the &c., whoever or whatever it may be, is absurd, and not worthy of consideration, bearing in mind the future of the Glenrock concern. It appears to me that Mr. F. Jennings, whom I have never seen to my knowledge, is not to be looked upon as an able man in this matter, nor one whose opinions should be blindly followed. He has been secretary to the above two companies, and has visited the property. Through his directors he now writes of the difficulties that may arise as to the use of the water, and to the possible hostile management that may occur through changes in the direction of these two companies. Surely as these properties are situate in a country subject to British jurisdiction the shareholders should not go out of their way to suggest these troubles, as in the event of any such circumstance happening there is no reason to doubt that a remedy is close at hand. It ought to be, if one may rely upon the statements heretofore made with respect to the use of this water supply. I will not trespass on your space more than possible, but I should like to quote one or two facts in support of the foregoing.—Wood and Water: Circular of Jan. 10, 1881: "The value of the exclusive right to use the river which flows through the estate for the purposes of the company can scarcely be over estimated." Chairman's statement at meeting, Jan. 20, 1881:—"Whatever information you have (from us) you may rely upon as being sound. The opinion your directors have of the property is that it is second to none \* \* \* because we have the means of working cheaply and economically. We have plenty of water, and you will have more wood than any other estate, with the exception of one or two in the Wynad. A very large proportion of the estate is dense forest, and is of immense value for mining purposes." Mr. Ryan's statement at the same meeting:—"You have upwards of a thousand acres of the finest forest within an auriferous area of 525 square miles. It is only a question of time when some of our neighbours will come and beg your help in the matter of timber." Mine-captain's report, Jan. 29, 1881:—"As regards water power, Mr. Syson carefully gauged the stream in November last, the dry season, and found it to be 450 gallons per minute, and in the month of June last, the commencement of the rains, it was 550 gallons per minute; there is, therefore, ample power, as stated in my last." Manager's letters sent out April 21, 1881, speaks of Glenrock, "with its unrivalled advantages of fine timber and abundant water supply, together with the natural advantages of gradients."

These reasons could be multiplied very largely, but the above are sufficiently strong I submit to prove that we should not be fright-



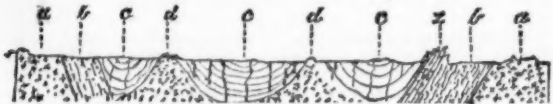
ened into a scheme that certainly will not benefit the Glenrock shareholders. What necessity for amalgamation exists at all? I suppose the statements made on many occasions, and referred to in the printed documents issued by the company, that there is more than a probability of the property being split up into portions for sale to other companies, are to be relied upon. Then, again, we have been told repeatedly that our property is highly auriferous, and second to none. Why, therefore, should we barter away our 3000 odd acres, to participate in an estate of some 600 odd acres, or about one-fifth of the area of our property, especially noting the fact that the larger area has been purchased at something like a third less cost per acre than the property proposed to be amalgamated, and further at a cost of within 14. per acre of the cheapest purchase made in the whole of the Wynad district.

Holloway, Jan. 24.

#### ON THE GEOLOGY AND VEIN FORMATION OF THE COLAR, MYSORE.

SIR,—A few remarks on the above subject may not be uninteresting at the present time. The topographical features of the Colar are extremely tame. There are no peaks and precipices as in the Wynad; indeed topographically and geologically the conditions are very dissimilar. The Colar field is situated in a vast grass and scrub covered plain, scores of square miles in extent, broken only here and there by small ruts or gullies which have been worked out by the monsoon rains. It is probable for miles there is not a depression in the surface that is 100 ft. below the general level. Geologically, however, there is much that is instructive and interesting. The country rock is much disturbed, the strata bent and tossed by intrusive rocks; in fact if eruptive and alternating beds are essential for vein formation, those conditions are not wanting in the Colar. The base of the series is syenite. On this resting conformably and at a steep angle are gneissic and mica-schist rocks. The next are shales. But these latter are much broken and distorted by intrusive porphyritic dykes, which plutonic rocks can be traced by bosses of their outcroppings for great distances.

Owing to the flatness of the general surface, together with the absence of deep gullies with rock exposed sides, no sectional examination of the strata of any magnitude can be made. But the numerous shafts which have been recently sunk in the search for gold having invariably passed down through the shale and intercepted in the bottom the hard plutonic rock, it may be inferred—indeed is practically proved—that this porphyritic mass has interstratified itself between the shales, tossing and disturbing the latter in every possible manner. How thick this plutonic rock may be there is as yet no available data. An east and west section showing some five miles of the country at right angles to the strike of the quartz veins will perhaps convey some idea of the general stratification. Vertically it will represent about 150 ft.



a a are syenites; b b are gneissic and mica-schists rocks; c c c are the distorted shales; d d being the outcropping porphyritic dykes. But it must not be inferred there are two dykes running regularly through the country. The plutonic rocks are exposed in many intermediate places. The points through which I have passed the section—i.e., by the Oregum Mine—would, however, be as above, the outcropping porphyry running in a northerly and southerly direction, near the east and west boundaries of this property being more than ordinarily persistent. The basin c between d d may be said to be that in which the exploratory work of the mines is now being carried on. In fact the mining sets longitudinally adjoin each other, for if the east and west boundaries of (say) the Oregum be extended about five miles southerly and two miles northerly it would practically embrace the whole line of mines, so that operations are nearly entirely confined to an area of about seven square miles. To all appearances the veins are lenticular masses of quartz passing down through the decomposed shale, as shown by the dark lines in the section. How persistent the quartz is practice is proving. That these masses of quartz are not connected below ground by true fissures is fairly evident, for in shafts sunk presumably on the same vein and not far apart if one be pumped to its bottom the other will still remain full of water.

How the veins were formed is an interesting question. That the porphyry is posterior in formation to the shales the contorted condition of the latter proves. But there is no evidence yet to show that the quartz veins were existent previous to the intrusive porphyritic rock; in fact it is not difficult to conceive them to be infiltrated siliceous deposits, so strikingly alike are they to the siliceous limestones or chert-rocks. But the most striking feature in the Colar is the great bedded quartzite. This great quartziferous belt is in places 200 ft. wide, and crops right up out of the softer shale to a height in places of 200 ft. or more; in fact it forms the only continuous range of hills passing over the plain. None of the mines are working in this ferruginous quartzite, although there are considerable "native workings," one old underground excavation being perhaps 2000 cubic yards in extent, as well as a long length of open cut work about a mile south of this point. At first I thought it to be a huge vein (c in section) passing through the country, not unlike that of the great quartz lode in Calaveras County, California, but on examination it is fairly evident it is only a stratified quartzite, conformable and contemporaneous in formation with the shales, the disintegrating atmospheric agencies having more rapidly worn away the soft clay slates by leaving it so jutting out has given it a vein like appearance.

London, Jan. 24.

#### THE GOLD AND DIAMOND FIELDS OF SOUTH AFRICA.

SIR,—Christmas has been spent at Kimberley in a manner befitting the climate. Most of the young people formed parties of from 20 to 100, and have had agreeable picnics on the banks of the Vaal River. In most cases worked ceased in the mines from the afternoon of the 23rd to the morning of Dec. 27. The whole place has a puerile holiday appearance, and although the thermometer has ranged from 96° to 108° in the shade, I am pleased to note that there has been less drunkenness than I have ever seen amongst a corresponding number of inhabitants at Christmas time.

There is nothing new in mining since my last. News from the Transvaal is of a very unsatisfactory character. Diggers from the gold fields arrive here daily, and complain bitterly that after they have been working years on dead work, constructing watercourses, &c., for the purpose of washing away the few payable patches of auriferous ground, the Government has given away their rights to a few, Abrahams, Isaacs, and Aminadabs without compensation. The general opinion here is that there is a great deal of corruption at the bottom of it. I believe there are a few good properties on the Transvaal gold fields, but only a few. At Pilgrim's Rest some persons, named Lockhead and Prettyman, have six or seven claims, worth about 30,000.

At Mac Mac there is some very rich ground, and at Spitz Kop the claims of Ferguson and Company are rich. I hear that at a place called the Falls, there are some very rich veins of gold, belonging to Messrs. Cope, White, and Co. But on all the Transvaal gold fields the amount of payable ground is very limited, and is already in the hands of individuals, and any attempts to deprive them of it is no better than robbery. However, it is my opinion that those concessions in the Transvaal will turn out to be White Elephants, inasmuch as most of the diggers will show fight rather than be deprived of their rights.

I have just seen a nice sample of pyrrargyrite (red silver ore) brought from the western part of this province. The party showing it thought it was iron ore, and says there is plenty of it.

The year closes with a commercial crisis in Cape Town, brought on principally through reckless speculation, and the floating of so many questionable companies. Nevertheless, there are not wanting signs of a more healthy state of affairs, and it is the opinion of some of the best abused men in the place that 1882 will see the mines of Gri-

qualand West placed on a basis as sound as any other mining industry in the world.

I would impress on your readers that the present is a favourable time for investing in diamond mines, provided they exercise proper caution, and buy into bona fide concerns.

Kimberley, Dec. 29.

#### GREAT SOUTHERN MYSORE GOLD MINING COMPANY.

SIR,—The second ordinary meeting of this company is announced for Tuesday next, and I would suggest that the shareholders attend in force, and insist upon the conduct of the directors being explained satisfactorily; and, if not, then call upon them to resign, and elect substantial shareholders in their place. I trust that the charges brought forward by Capt. Bray will receive due attention on all sides. If there is no chance of the company paying it is a question for the shareholders to decide whether a stoppage now would be advisable or not. If no proper explanation be given do not pass the accounts.

CANDOUR.

#### MYSORE REEF MINING COMPANY.

SIR,—Will you allow me to ask through the columns of the Journal why it is that the shares of this company are quoted so low on the market, seeing that we have an energetic manager there with his stamps near ready for working, with any amount of quartz to operate on, said to contain quite sufficient gold to pay, &c.? A year ago, before any manager was sent out there, or any work done on the property, the shares were quoted at a ½ to ¾ premium. It would seem that while everything connected with the mine proper remained buried in oblivion the shares were valuable, but as soon as the magic pick of the miner broke the surface all our gilded balloons vanished instantaneously, and left us nothing but a few shreds of paper to look at as value for our money. Would it not be advisable to stop operations for awhile, and recall our manager and staff for a few months? Our shares might then go to a premium again, a good substantial dividend might be paid out of capital just by way of encouragement; some of us who went in at a high figure might then hope to come out with a little less loss than we could do now. At any rate, it seems to me that many of us who have been led to expect great things will come out of the scrape sadder if not wiser, but surely not richer than we went in.

The present low price of shares, combined with the statements which have recently appeared in the Journal of this and the adjoining claims, are not calculated to inspire hope in the breast of anyone who believes or thinks he has been duped.

Jan.

#### MYSORE GOLD MINING COMPANY.

SIR,—At the statutory meeting of this company, held in November, 1880, and reported in the Journal of Nov. 6, a letter from Capt. Rogers, dated Oct. 4, was read. In this letter he stated—"No. 2 Lode: In this shaft the lode is looking very kindly; the vein at present is about 2 ft. wide, and widening as it goes down. The quality of the quartz I like very much indeed. I have examined many of the stones, and find a large number of fine strings of pyrites running through them. This is a good sign. No. 3 lode shows a very masterly appearance, being from 2 to 3 ft. wide, and in my opinion will in depth prove profitable."

\*\*\* This week I have employed several women to bring into a pile all the large quantity of broken quartz lying around, pending the arrival of the steam mortar-mill. On a closer examination of the rock I am convinced that it will pay very well for milling." In another letter, dated Oct. 13, he stated—"No. 3 shaft is about 400 fms. south on the same lode. I am very pleased to say that the character of the rock is all that can be desired. The lode is also widening out; now 2½ to 3 ft. wide; present depth of shaft, 18 feet. This shaft is going down on the course of the lode; but, not having any assay instruments, I cannot give the actual value of the rock, but in washing some I should judge it to be worth fully 15 dwts. of gold per ton of rock, if not more. I have about 10 tons of quartz broken from this shaft; a more regular, well defined lode cannot be seen. With native labour we can sink about 9 ft. per week." "Surface: In going over the company's property I find hundreds of tons of quartz lying broken on the ground, and knowing it will pay I have a number of native women picking it up and putting the same in heaps or piles." \*\*\* I calculate I have 200 tons of quartz ready for milling." Mr. John Taylor, jun., also stated that a quantity of machinery had been sent out, and that a stamping mill with 30 heads has been ordered. Since that meeting it has been reported that the champion lode had been struck 7 ft. wide, that the other lodes had improved in size and appearance, and that gold was visible in the quartz, &c. The 30 head gravitation stamps, as well as two batteries of elephant stamps, have been sent out. Here we have stamping power for (say) 30 head of gravitation stamps at 1½ ton per diem=45 tons; two batteries elephant stamps at 20 tons per diem each battery=40 tons per diem: total stamping facilities 85 tons per diem." Then we were regaled with the golden news that crushing was to commence in earnest some time in July, which was postponed from unavoidable causes to August, and again our pleasant dreams were doomed to disappointment, as crushing could not commence until September. At last, however, came the glorious news—with a grand flourish of tinsel, the presence of no less than royalty itself, a grand dinner, speech making, and all the usual bunkum appertaining to such shows—we are told crushing had really commenced, and we were led to believe the golden wire would soon reach us home here, and that as it was manufactured there we should be able to reel off this golden thread without any further difficulty, and we might expect that all our golden dreams would soon be realised. Alas! how vain are man's hopes, and how easily disappointed, although we know that "promises, like pie crusts, are made to be broken."—Query: Have broken promises anything to do with broking operations—and how few remember the adage under such circumstances that "all is not gold that glitters."

It is now four months since crushing commenced, and as yet we hear nothing of the result. Surely there must be a very big screw loose somewhere, as with a crushing capacity on the ground for 85 tons per diem, and no result made known during four months, when we generally get the returns of some of our gold mines about every 10 days, and at least whether it pays or not the returns are made known and published, and the gold shipped home once a month. Now, suppose that all the machinery was not erected and ready for working, but that crushing was commenced with one battery of elephant stamps only—capacity 20 tons per diem—and supposing it only worked half time for 100 days since it started, we should have crushed 1000 tons of quartz, and it is not too much to suppose that this quantity of quartz should have been available, since we see that Capt. Rogers had 200 tons in the beginning of October, 1880, and the mines returning quartz from the explorations ever since; as well as the hundreds of tons of quartz lying about on the surface. Now, 1000 tons at 15 dwts. per ton—according to Capt. Rogers' estimate of at least some of it—equal to 750 ozs. of gold; or to put it at the much smaller estimate of 5 dwts. per ton, which some assert will pay there, we should have 250 ozs. of gold remitted for the time the crushing has been going on. This is a very low estimate compared with what has been promised in some of the prospectuses and speeches connected with the companies on the same field—viz., not less than 1 oz. to the ton, and 50 per cent. dividends in the second year of working. This company is now well on in its second year of working, and as yet there is no prospect of a yield of 1 oz. to the ton, or even a shadow of a dividend. "Coming events cast their shadows before."

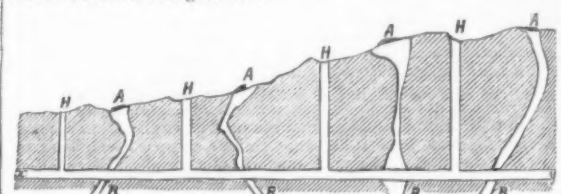
It seems evident that the promises made by the vendors and promoters of the companies on this field will not be realised very readily. I would suggest that they should part with a few of the thousands they have received as purchase money in buying gold dust from Australia; they could soon get it up to India and ship it home from there. This would cause some sensation in the share market if they could make the public believe the gold came from their mines. They would then be able to state that their promises had been realised; but under present circumstances no one would be justified in believing that their past golden dreams will ever be realised, or that they will ever see the shadow of the money again which they subscribed to send this machinery, &c., out to India, for the purpose of doubling

and re-doubling it in a very short time, as they were promised it should be. Mr. Bell Davies reports that there are true fissure veins and payable quartz in any quantity are not yet substantiated by the returns of the four months crushing at this company's mines. Surely here is a chance for Mr. B. Davies to go in and win laurels for himself and dividends for the shareholders if, as he reports, the material is there to work on. As Capt. Rogers does not seem inclined or unable to make the rock pay, let Mr. Davies have the management of the mine for awhile, but in the face of his reports and the results attained I would suggest that he be allowed a percentage of the gold got instead of a fixed salary. At any rate an arrangement like this would give some confidence to the investing public even at the present time. In the absence of any returns from the crushings there does seem to be some truth in the remarks made by "Photophone" in the Supplement of the Journal of Jan. 14, that "the quartz is only fit to use as road material," and also that the "Colar gold (?) field" is very nearly "a myth."—Jan. 23.

B. C.

#### THE GREAT SOUTHERN MYSORE GOLD MINING COMPANY.

SIR,—The frank and manly defence of Capt. Bray against my letter of Jan. 11, which was reluctantly published on account of Capt. Bray's persistent attacks on the above company, and the injury he was doing to gold mining generally, is entitled to the respect of all right-thinking men. I accept Capt. Bray's version of the events which occurred in Siam, after I left the country in 1873, as substantially correct. It appears to me that, on Capt. Bray's own showing, the only practical result of "Gold Mining by Europeans in Siam," after April 1873, was, that Tjakune Pra Pee Cha lost the number of his mess. Now, as the Moang Kabeen Gold Reef was reputed to be 20 ft. wide, yielding 15 dwts. to 1 oz. gold per ton, perhaps Capt. Bray will be good enough to state how many tons of quartz were treated by him and the two staffs of miners sent out to him in 1874 and 1875, and the total returns of gold during these periods. It was my good fortune to examine the collection of Siamese gold ores in the possession of his Majesty the second King, and probably no European engineer living has seen more than the writer of the Kingdom of Siam. I have visited Pitschebooree, Champon, Langsoun, Nihoot, Kalantan, Singora, Patani, and other minor places; but I repeat that gold mining by Europeans in Siam was practically at an end when his Excellency the Kalahome stopped the finances of his Excellency the Kromath. Referring, again, to the Great Southern Mysore, I do not consider Capt. Bray did either the property or himself justice. It must be remembered that we are speaking of a country which has produced gold for centuries; that the conquerors of each dynasty thought nothing of demanding a couple of millions pounds sterling as the ransom for a town—such ransom to be paid in gold only. This being so, whatever Capt. Bray may be pleased to think, the country is established as gold-bearing, and worthy of practical development. In carrying out the exploratory operations which were committed to his care, I consider Capt. Bray has utterly failed, and because he quarrelled with his bread and butter he must now occupy his leisure moments in attacking the company that employed him. To show him where and how he has failed. I will sketch a section of a gold field.



A.—Blows of quartz on the surface.  
B, R, R, R.—Supposed position of reefs going down.  
H, H, H, H.—Small trial shafts.  
X, Y.—Trial level driven at a depth of 30 or 40 ft.

To prove whether the surface quartz holds down in depth, it is usual to run a trial level right across a square mile block; and this Capt. Bray did not do. I should have put down a dozen such trial shafts at the same time, and holed through from one to the other. Until this was done, he could not possibly fix on a site for his main shaft. Quartz reefs bearing gold are most erratic, and will frequently squeeze to a small leader only for 6 ft., 10 ft., or even 30 ft. in depth, when they usually become settled and well defined. This, no doubt, Capt. Bray knows perfectly well, and, therefore, was not justified in condemning any one's property until he had thoroughly proved the surface quartz in this manner.

Norfolk Street, Jan. 26.

RICH. BARKER, M.E., F.G.S.

#### THE INDIAN PHOENIX GOLD MINING COMPANY.

In a letter to the directors, dated Pundular, Wynad, Madras, Dec. 31, Mr. A. W. Rixon, the secretary, writes:—"I have much pleasure in informing you that our works have been inspected by a number of the leading managers of the district, and that I may congratulate the company upon the favourable opinions expressed by one and all on the extent and character of the operations which have been undertaken, and the probability that your machinery, which is undoubtedly the best in the Wynad, will shortly be at work. The occasion of the inspection arose from Col. Howard, the Chairman of the Glenrock Company, and Mr. Low, the director of the Consolidated Company, visiting their respective properties, one of which bounds yours on the west and the other on the east. These gentlemen expressed a wish to see our works, and Mr. Grove thought it would be a good opportunity to invite all the leading men that he was acquainted with in the neighbourhood to meet them and devote an entire day to seeing what had been done on your estates. The nature of the ground, the distance to be got over, the number and variety of places and things deserving of notice are such that it was barely possible even with the omission from the programme of several most interesting spots and workings, both ancient and new, to compress what we had to show our friends into a long hard day. Our visitors met at this bungalow at eight on Thursday morning, the 29th inst., some of them having had many miles to ride. The following are the names of the gentlemen who were present, and I attach to each his official position to enable you to judge of the high qualifications they possessed for a thorough examination and sound criticism of what they had come to see:—

Colonel Howard, Chairman of Glenrock Company.  
Mr. Low, Director of Consolidated Company.  
Messrs. H. V. Ryan and A. Wright, most influential local planters.  
Mr. Cooper, Manager of the South-East Wynad and Perseverance Companies.  
Mr. Gilkison, of the firm of Pierce, Leslie, and Co., represented the Ripon Company.  
Mr. Gitchell, Manager of the Rhodes Reef Company, and representing the Devala Moyar Company.  
Mr. James, Manager of the Consolidated Company.  
Mr. James, Jun., Manager of the Trevelyan Company.  
Messrs. Moore and Ashburner, Managers of the Kingston Sandhurst Company.  
Mr. O'Donoghue, Manager of the Glasgow and Alpha Companies.  
Mr. Pinching, Manager of the Glenrock and South Indian Companies.

The party proceeded from here on horseback, and the bird's-eye view which our elevation affords much facilitated the pointing out of the position of the various geological and physical features of your estates, and the general position with reference to neighbouring properties, and above all the water-shed which you possess, and from which rises the stream traversing the estates through their longest axis, and called by the natives Dodatoad, or Big River, but which you know under the name of the Phoenix River. This stream has within the property a fall of probably about 1000 feet, and is perennial. The value Mr. Grove attaches to it you are fully aware of, and when you compare the cost of steam requiring to be raised with the worst possible description of wood fuel with that of water-power, you will have no difficulty in appreciating the soundness of his views on this subject, and the saving that will be effected by utilising only the power which Nature has gratuitously placed at the company's disposal.



Before arriving at the head of the water-race, the company examined the site for a reservoir; it has already been cleared of jungle, and covers about 5 acres. The water will average from 12 ft. to 15 ft. in depth, and can be easily secured by a dam across a narrow ravine on both sides, and on the bottom of which there is solid rock.

The party walked from this point along the course of the water-race, which was most minutely examined. It is scarped out from the mountain side, and the earth and rockwork required to be done, and the manner in which it was done, elicited repeated approval. The plans on which the race has been constructed have provided, in addition to the room taken by the race itself, for a broad roadway, along which it is intended to lay a tramway for the delivery of ore from higher levels to the top of the final shoot to the battery. The position of, and the manner in which the various shoots are to be carried out were fully explained, as also the excavations which were being made at the foot of each of them for large hoppers to hold from 500 to 1000 tons of quartz. The surprise at the character of the race was no doubt great, but the real point of the entire work could only be seized when our friends reached the end, where they looked down upon the splendid shed containing the battery, the stream pouring away 182 ft. below, and the pipe trench for the turbine running up from the former at an angle of about 45°. Just at this point, at a few feet from the line of turbine, pipes looking both above and below the incline by which every piece of the machinery has in consequence of insuperable difficulties in the way of road building had to be lowered. The termination of the race is about midway on the incline. The view both up and down the gorge, with the almost perpendicular thickly-wooded mountain running up the opposite side of the stream, and the Malabar plain stretched out beneath the gradually opening valley, is amongst the loveliest sights in this country.

We then descended to the battery, where the whole parties' attention was engrossed with the buildings and machinery. Every detail of the foundations, stamper boxes, machinery, and ripple tables were carefully looked at, and unanimously pronounced to be of the very best and newest design. The solidity and simplicity of the entire works, and the manner in which they, including mining, had been carried out under the management of only five Europeans were most highly praised.

The company then went to Groves Tunnel; this has been driven about 20 ft. below some old workings through solid granite. It has been freely predicted that we should never find the quartz below the hard country rock; but in this case our visitors could see for themselves the quality of the stone that the miners had had to drive through, and the quartz reef at the end of it. From the chips and mullock at the end of this heading we washed a pan full of dirt, and the party were delighted to see with their own eyes a prospect of gold, which showed that there is every reason to believe that this part of the Agnew Reef, which runs through the entire property lengthways, will contain the metal in payable quantities. The next spot visited was at a much lower level, and was an entire novelty; we call it our alluvial washings. After a walk down a most precipitous and circuitous path the party suddenly came upon a large excavation in the valley, from the top of which half-a-dozen rippling flashing streams of water were directed by wooden gutters and canals down against the sides and upon the floor beneath. This work is only in embryo; but there is already about 30 ft. face out into the alluvial bank that forms the steep side of the stream. In the centre of the plateau made by the water stands a boulder about 20 ft. square, which had been lowered at least 15 ft., and which was remarkable for having been supported by an underpinning of stone to protect the native gold seekers whilst they were digging out the dirt from underneath, and which they washed in the adjoining stream for gold. We then invited anyone who liked to wash a pan of dirt for himself, and the result of every operation was a good show of gold, and some of the specs were larger than those I sent you in my last letter. It will be a little time before we get down to the bed-rock and put in a proper washing flume; but when done I sincerely hope this branch of our business will prove remunerative, and, under any circumstances, it will give a new direction to the thoughts of many interested in similar undertakings to your own in this country, and may lead to important results. Mr. Grove had arranged for the horses to be brought down by a mountain bridge path to the lowest possible point, and there our friends remounted and thence returned to the battery, where we entertained them in the best way our own resources and those of the country permitted. The health of Mr. Grove was drab, and he made a speech in reply that was listened to with marked interest and attention. The party then proceeded to the Gifford's workings, right above the top of the incline, and were shown the masses of quartz that had been uncovered and were ready to drop to the battery as soon as the shoot was finished. There was no time to wash any of the quartz here, but I tried some myself on the following day and found a very fair show of gold. This working is like the Grove Tunnel on the line of the Agnew Reef. As evening was now drawing in the party were compelled to break up, and did so, I firmly believe, with a full appreciation of what they had seen, and the conviction that the Phoenix Company had an excellent property, and, on the whole, was in a favourable position as any in the Wynaad. The opinions of many of them on the subject will sooner or later be known in England, and both Mr. Grove and myself hope that the management will be considered by them to have come tolerably successfully out of a somewhat bold and very trying ordeal.

A. W. RIXON.

#### INDIAN GOLD MINES—THE WYNAAD DISTRICT.

SIR,—Taking only six of the Indian gold mines in the Wynaad district I find that their highest selling price has been 2,336,250L. and the lowest 576,875L., so that the difference of 1,759,375L. represents profit or loss as the case may be of those who have speculated in the shares. The mines mentioned have I estimate cost the promoters 15,000L., and were resold to the companies for about 450,000L., showing a profit of 435,000L. Many of the other Indian gold mines are unsaleable or selling at 2s. 6d. per 20s. share. I know a good deal about the Wynaad district. The purchase money of the mining rights is in some cases of almost no value; the general rate charged is 50s. per acre on a 12 years' lease, the mining restricted to five or ten acres only. The rest of the land is of no value. The coffee plantations as a rule are in debt, and never make expenses by their plantations. On a large and properly managed scale the Wynaad may pay, but of the Mysore district I do not entertain so high an opinion.

There is little doubt gold bearing quartz exists in the Wynaad district, but the reefs are patchy; gold may be got for a few yards, and then the reef will be of no value, for it may be 10 or 200 yards. Native labour is, considering its results, the dearest in the world. One Chinese miner is as good as four Indians, and one Cornwall miner as good as six or eight Indian labourers. Wood is plentiful in the deep glens or ravines, but the cost of cutting, hauling, and splitting would make it dearer than English coal at 10L. per ton. Water is scarce except during the rains, and then from fever and weather neither natives nor Europeans can work unless at great risk and under disadvantages. To work advantageously in the Neilgherries at mining would require a capital of one or two millions, to form a network of railways, to build proper reducing works, to build a town, well drained, for the houses of the workers of all kinds under good management, on a comprehensive scale, the Wynaad mines would pay.—Apley Terrace, Glasgow, Jan. 26, M. M.

#### BRITISH ENTERPRISE IN COLORADO.

SIR,—Having been absent for a short time, I did not have an opportunity until now of seeing a letter which appeared in the Journal of Jan. 14 from Mr. Ramsay Cooke, in which he refers to a previous communication of mine to him, and a subsequent report on the property of the Olathe Silver Mining Company of Colorado. In explanation of the matter, permit me to say that shortly after writing to Mr. Cooke I wrote to Mr. Kendrick, secretary of the company, asking permission to inspect the official maps and documents of the company, in order to ascertain the correctness or otherwise of the damaging statements made to me by those who were supposed to be interested in the matter.

The directors very readily complied with my request, withholding

nothing that I desired to further my enquiries, and after satisfying myself that my informants had misled me, and that my statements to Mr. Cooke were not justified, I felt it to be my duty to correct any false impressions they may have caused, and that that could be best done by furnishing the report which was published in the *Mining Journal*, and for which I received not the slightest consideration from the company, notwithstanding the insinuations of Mr. Cooke. I wish to say further, that in publishing my letter, known to Mr. Cooke to be strictly "private and confidential," he committed a great breach of trust, and his conduct can be better understood when it is known that some time before the date of publication he had in his possession a personal letter from me, stating that I no longer entertained the opinions previously expressed.

Newport, Monmouthshire, Jan. 24.

J. FITZ BRIND.

#### ARIZONA, AND ITS MINERAL RESOURCES.

SIR,—I noticed in the Journal the remarks upon the Copper Queen Mine in Cochise County. In this county is to be found some of the largest and most valuable copper mines in the territory. The veins are large, the grade high, and the appliances at hand cannot be excelled. The mines are about 60 miles from the railroad at Benson, and about 20 miles from the Sonora line. The Copper Queen, the leading mine of the camp, is an immense mountain of ore. It has been explored 160 ft. in length, by 150 ft. in depth, and 120 ft. in width, and as far as the explorations have extended rich ore has been encountered everywhere. The claim is 1500 ft. long and 600 ft. wide. The two 30-ton smelters are kept running steadily, and the daily output is about 13 tons of pure copper. The ore is a carbonate, and a black and red oxide, and averages about 22 per cent. The mine has been opened by 110 fathoms of shafts, drifts, and cross-cuts, and has already yielded 120,000L. worth of copper. Another company, the Neptune, adjoining, owns nine claims, the most prominent of which shows ore giving 24 per cent. The Twilight shows a 6-ft. lode of red oxides, carrying 25 per cent. pure copper, and is opened by a shaft only 12 fathoms in depth. The Holbrook has a 10-ft. lode of red oxides, but has little work done on it. There are at least a dozen other copper mines in this district, all presenting fine prospects, but little work has been done on any of them.

In Pima County, besides its lodes of gold and silver, it is also rich in copper. High grade ores are found in the northern end of the Santa Rita Mountains, about 25 miles south from Tucson. The outcrop of the lodes cover several hundred acres, and are composed of carbonates, red oxides, and copper glance. Some of the lodes are near 50 ft. wide, giving from 15 to 25 per cent. The copper lodes in the Silver Bell district, 50 miles from Tucson, are very large and rich. In some parts they consist of immense dykes, in places 50 ft. wide, carrying carbonates and red and black oxides. A smelter, with a capacity of 30 tons, is being erected by the Huachuca Company.

The Eureka Copper Mines, in Yavapai County, is the leading mine of the group there. At 33 fms. in depth the lode is from 8 to 16 ft. wide; the ore is of high percentage. There are many promising claims in this district possessing the advantages of wood and water. In Pinal County rich lodes have been found, and are now being worked. In the Ida Ingalls Mine there is a 14 ft. lode in width of copper glance, a large part giving assays of 30 per cent. Their shaft is only 16 fms. deep, and a 10 ft. level only has yet been driven. The Globe Copper Mine, in Gila County, contains a large lode, which has been taken up for miles. The ore is of a high grade, carrying 5L. per ton in silver.

I could lengthen this letter considerably if needful in drawing attention to other parts of the territory, where there are rich copper lodes, but it is now established beyond contradiction that Arizona is not only rich in copper ores, but is also equally remarkable for the enormous number of silver lodes which have been discovered, and on many of which most successful operations are now carried on, principally by United States capitalists. British investors in mines appear to prefer to throw away millions of money on Indian gold mines and worthless mines in Cornwall and Devon instead of investing it in countries where there are proved to be rich mineral deposits of gold, silver, and copper.

W. DINHAM KING.

Camelford, Jan. 27.

#### THE HOOVER HILL GOLD MINE

SIR,—As one interested in this mine it seems strange to me that the directors do not bring strong pressure to bear on our resident manager, Mr. Remfry, and make him put more energy into the working. Last August the stamps went to work, and the only tangible results appear to have been two bars of gold, sold for 670L. (about enough to pay the mine cost sheet for six weeks), a parcel of sulphuret sent to New Jersey in October last, and of which nothing more has since been heard, and 1 ton of high grade ore shipped to England last month. Our shares have fallen from 25s. to 9s. 3d., and still have a downward tendency. The reason of this decline in value is obvious. In the report issued with the prospectus, which was written by Mr. Remfry, no mention is made of the actual character of the ore. We were led to believe that it was a good free milling ore, and that free gold would be obtained in quantity by ordinary stamping. Mr. Remfry writes—"The quartz from Gallemore, Briels, and Provost was strongly mixed with dark clay-slate, but contained no sulphures, and on close examination no gold was visible to the naked eye, yet these three places give an average of 21 ozs. 4 dwts. per ton." It was only after the first crushing, early in September, that Mr. Remfry awoke to the fact that 70 per cent. of the gold from these three places was in the sulphures, and that the machinery at the mine and his treatment of the ore were not calculated to extract it.

Why not, then, pass through the 20 stamps now at work some of that "entire hill side" of which he speaks in his letter of April 19 as "all the surface around here for a few feet in depth will run 820 per ton, principally gritty decomposed clay-slate, and in some places it goes down many feet, and covers acres of ground." Of this disintegrated slate at least 80 to 100 tons could be run through the stamps per day, which would yield sufficient to pay a 25 per cent. dividend next June. In the meantime the directors should send out a first-class consulting engineer to report on the best machinery and best means of treating our high grade ore, and also to advise Mr. Remfry as to the future. With proper management and suitable machinery Hoover Hill will soon enter the Dividend-paying List, and before many months are past should stand as high as any American gold mine.—Cheltenham, Jan. 24. AUCUM.

#### LA CONCEPCION MINING COMPANY.

SIR,—The notice published respecting this company affords fresh evidence of the unguarded statements made by company wreckers in their instructions to counsel when striving to obtain the carriage of a liquidation order, frequently misleading the Court and the public. In the present instance the statements made in Court were the very reverse of the actual truth, and, in simple justice, I ask you to give publicity to the following facts:—

This company was formed to purchase extensive mining concessions granted by the Government of Venezuela to General La Rose for distinguished services by him to his country. The property was surveyed, specially inspected, and reported upon by the late Mr. Stuart, M.E., F.G.S., at an expense to the promoters of between 2000L. and 3000L. The report made by Mr. Stuart was published in the mining journals here, so that the fullest information was given as to the character of the property. Brokers of position in the City, who knew Mr. Stuart personally, after investigation gave their co-operation to the directors.

These precautions having been taken, the company was formed at a still further expense to the promoters of between 1200L. and 1500L., and the prospectus published. Now mark the course the directors took. They announced in the prospectus that neither the purchase-money of the property, nor any part of it, would be paid until further examination of the property had been made on behalf of the shareholders by an independent engineer. The directors applied to the Mining Institute and to well-known gold mining authorities for the best and most competent man for this purpose, and a gentleman of high repute was sent out. This gentleman reported that although there was gold on the property it was too much distributed to be of

sufficient commercial value, but he strongly advised that an adjoining property belonging to the same owners, which he reported could be obtained in substitution of the first property, should be acquired by the company. Upon the receipt of this report the directors called the shareholders together and submitted the proposition to them; the majority approving, but some disapproving, it was decided to liquidate the company at the least possible expense, and the directors themselves presented a petition.

Now, Sir, not one farthing has ever been paid to the vendors or to the promoters for the property or preliminary expenses, and I venture to submit that if all directors were to act with the same caution and prudence as has been here exhibited there would be fewer complaints and less loss to investors, or to the reputation of these undertakings. If the course taken by those connected with this company from first to last is open to the severe censure contained in Mr. Justice Kay's remarks, it is difficult to see what conduct would be entitled to praise.

ROBERT ANGUS,

Chairman of the Board of Directors,

Great Winchester-street Buildings, Jan. 21.

#### THE CELEBRATED KONGSBERG SILVER MINE, NORWAY.

SIR,—I know not whether you will deem this letter worthy of a place in the Journal; whether or not I beg to place it at your disposal. The town of Kongsberg is situated in a beautiful and fertile valley on the River Lauven, in the province of Aggershuus, and about 45 or 50 miles west-south-west of Christiania, the capital of Norway. It contains a large brick-built church, said to be one of the handsomest in the country. It is the seat of a mint and of several other public buildings; has manufactures of firearms, Government powder-mills, and a large smelting establishment, also belonging to the Government, for the reduction of silver and cobalt ores, obtained from the mines in the neighbourhood. The town contains about 5000 inhabitants; but, from the area which it embraces in looking at it from a distance, one would be led to suppose that it contains a greater number. This deceptive appearance arises from the fact that it is somewhat scatteringly built. The houses, which are large and substantially constructed, are generally detached, with spacious spaces and large gardens between each. The above-named mine, and which I recently visited, is the property of the Government, as are also the smelting works before mentioned. The mine is said to have been working upwards of 250 years. Like mines in general, it has had, and still has, its fluctuations—sometimes abundantly productive, at others not so much so. It is situated on a mountain of considerable elevation in the midst of a pine forest, and, as may be supposed from the long period of its existence, is most extensively worked. The lodes do not appear to be unusually large (say), generally not exceeding 2 ft. in width, but they are numerous. In a kind of indentation on the acclivity of the mountain, and on the western side of it, they have their stamping-mills and a cluster of large substantially built commodious houses, as dwellings, offices, and so on. The water for the stamps, dressing, &c., is obtained from a reservoir or small natural lake on the mountain's summit. From this place—the stamping-mills—an adit is taken up on one of the lodes, with the intention, it would appear, of extending it through the mountain. Whatever might have been the original intention it is now determined to continue it through to the eastern side, a length or distance of eight miles from its mouth, six miles of which has already been opened or driven through, and two miles more yet remains before them to communicate with the surface of the mountain on the opposite or eastern side. As a matter of course, within the six miles already extended many adit shafts have had to be sunk from surface for ventilation. The ground, which is a kind of porphyritic limestone throughout the mine, is exceedingly hard, so much so that being too hard to bore for blasting they told me that they are frequently under the necessity of having recourse to what is said to have been the old Roman method—that of heating or burning it—making an oven of the place, so that when cold it may yield to the stroke of the hammer. Slow work I should say. It is well that they are in a forest. Just at the brow of the mountain, or at the beginning of its declivity on the eastern side, there is an engine shaft sunk on the lode from the surface. From this shaft they are driving to meet the adit from the western side, and here also at the surface there are several good, large, and substantially built dwellings, offices, &c.

As before said, from the long period of its existence the mine may naturally be supposed to be most extensively worked. This is clearly evinced, if only by the heaps of rubbish lying at many different places at the surface, almost countless millions of tons lying at the mouths of the respective shafts. The lode stuff from the interior of the mine is extracted by tramway to the stamping-mills or entrance to the main adit, whence, after having undergone the routine of stamping and dressing, the ore is taken in small low-wheeled wagons to the Government smelting works at Kongsberg, a distance of about six miles. About midway up the mountain from the stamping-mills, on a flat or level space, there is another clump of houses, offices, and so on, and also another dressing shed. Here also is their second adit, through which the material from the lodes is brought by tram and deposited under the shed, where the larger pieces are carefully handled over and washed by hand in tubs of tepid water—tepid, no doubt, in consequence of the effect of cold water to the hand. The native silver is selected and deposited in the strong house, and the bulk carted down to the stamping-mills and there treated as the rest. The deepest part of the mine is about 700 metres, or 388 fathoms, below the surface. This mine, of world-wide celebrity, is still yielding pretty freely, yet not at all equal to what it has generally yielded. Its riches in times past have been truly marvellous! It is said that there is now lying in the museum at Copenhagen a piece of pure native silver taken from it of 6 ft. in length, 2 ft. in width, and 8 in. thick. This piece, according to the specific gravity of native silver, should weigh 5150lbs., or, say, 2 tons 6 cwt.

JOHN LEAN.

King-square, Goswell-road, Jan. 25.

#### NOUVEAU MONDE MINING COMPANY.

SIR,—In your last week's Journal I observed a letter from "A Holder of 1100 Shares in Nouveau Monde Company" in regard to the proposed new company to be formed to raise the necessary capital to complete the purchase of the property and to exploit the same, and in which the writer urges the shareholders in Nouveau Monde Company as well as the public to take up this scheme and to carry it through. I beg to thoroughly endorse the views of the writer of the letter under consideration. I am not acquainted or mixed up with market operations in London, but as a person just arrived from the district in which the property of the company is situated, and as a person who knows the legal position of the company in Venezuela, as well as the unquestionable value of the ten concessions purchased by the company, you will, perhaps, allow me through the medium of your columns to advise the shareholders in Nouveau Monde Company to put their shoulders to the wheel and save that which is probably one of the finest properties in the world. In this regard I will simply say that in Ciudad Bolivar certain parties are now anxiously waiting and hoping the failure of the company to make payment of the balance of purchase in order to secure it immediately for themselves.

The Nouveau Monde Company it must be remembered has been seriously interfered with in the past by attempts made by interested parties on one of their concessions, but it must also be distinctly known that the company's titles have been fully confirmed by the Supreme Court of the State of Guayana, and are to-day probably the best and most secure titles of any mining company in that Republic. As regards the value of the properties, it may be pointed out that were the purchase-money fully paid, and the company, therefore, in possession of their properties, there is every probability that the concessions 7, 8, and 9—through the latter of which runs the Chile lode for the whole length of the concessions, or 1000 metres—would be speedily sold to some of their neighbours (who are not so favourably placed in respect of that celebrated lode) if the company thought it desirable to do so. This lode has been proved to a depth of 388 ft. by the eastern shaft of the late Nacupai and New York, now Chile Company. This shaft is exactly on the lines dividing that company's property from that of the Nou-



veau Monde, the lode where it enters the Con. No. 9 of the latter company is proved by said shaft of an average width of 5 ft., and worth 4½ ozs. per ton of gold. These concessions alone are valued in the district at 100,000l., and it is generally understood there that one or other of the neighbouring companies would be glad to get it at that figure. The company also have a valuable property in contract 5 and 6 that could be treated in any way that might be thought desirable, and yet have in hand contract 1 and 2, where the mines and machinery of Nacupai are situated with contract 3, 4, and 10 for wood and fuel and most probably for mineral.

You correspondent very pertinently remarks, in speaking of the payment of the balance of purchase money, "It must be paid, or we shall lose all we have in it." I am pretty well acquainted with most of the vendors in Ciudad Bolivar, and I not only corroborate the statement of your correspondent, but would add, "And sharply too." Let the shareholders manfully take hold of this affair as they would of any other commercial business; let them at once get together the necessary 70,000l. or 80,000l. to complete the purchase, take possession of the properties, and exploit; let them deal with the working of their mines as they would the working of any other large commercial concern, and I feel content that within a few months the shareholders would be thoroughly satisfied with the results of their labours, and the credit of the mines of Venezuela would be raised to its proper level on the London market. On the other hand, let them hesitate now, and those properties are certainly lost to "A Holder of 1100 Shares in Nouveau Monde Company," as well as to his brother shareholders.

ONE FROM VENEZUELA.

#### VALUE OF MINES, AND MINING COMPANIES.

SIR,—Having read the letter on "Value of Mines and Mining Companies, and their Failures" in your last week's Journal, signed "Mining and Civil Engineer," I would ask for a little space to make a few comments thereon. "Engineer" pretends to be a fair and just critic, and would play the mentor to the investing public, but he writes with such palpable animus, and he deals with statements in such a misleading fashion, that it is clear he is only moved by spite against one or both the concerns he pretends to criticise. With respect to the Great Southern Mysore but little is known beyond what has been gathered from the correspondence in the *Mining Journal*, and "Engineer" gives us no additional information. Yet he assumes Mr. Bray's statements to be correct, and jumps to the conclusion that the mine is a swindle. Now, I think everyone capable of forming an opinion after reading the correspondence will think that, irrespective of the value of the mine, Mr. Bray would have remained to conduct the works there had not his *amour propre* been wounded by having to consult a "superior."

"Engineer" next attacks Monte Catini prospectus, and here his animus particularly shows itself. He first garbles the statements in such a way as to entirely falsify their meaning, then wanders about in a fog of figures which he evidently does not understand, and finally winds up with the magnanimous offer that "if the directors, &c., will assure and guarantee a greater profit than 20,000l. per annum for over 20 years, and that no more capital will be required, then he will be pleased to do the undertaking justice," and he adds "but I think it is impossible." Query, which? That the directors will give such guarantee, or that "Engineer" is capable or will be pleased to do justice to anything. I have known Monte Catini Mine intimately, and am, therefore, able to estimate the statement made with regard to it at their just value. The result has been that although not an investor in mines I have applied for shares in the new company, and I would here give a few of the reasons for doing so, and make some comment on "Engineer's" criticisms in passing.

The prospectus gives us to understand that the mine was worked long prior to 1856, and it then reached its greatest profit of 50,000l., and afterwards declined, until some years after it had become poor. It then fell into the hands of the late Count Boutourline, who working with more vigour and better management brought the mine again into a prosperous state, and during the last five years (to 1879 I think) the profit was 10,000l. per annum. "Engineer" says these results are ominous, and in the name of common sense I would ask why, or of what? A valuable mine from bad working and neglect of necessary explorations becomes poor. New vigour and more intelligence is brought to bear upon it, and it is then made to pay a continuous profit of 10,000l. per annum, besides creating a magnificent plant, and developing a large reserve of rich ore. And even this is not all, for we are told in the reports this profit was made from the crop ores only, all the other ores being treated by a French company, who put up fine dressing machinery on their own account, and treated all the wash ores and others that could not be dealt with by hand with great profit. The dressing machinery is now ceded to the proprietors, and anyone understanding the matter can see that from here will come a large proportion of the increased returns anticipated.

"Engineer" assumes that the Count got his profit only after making a large outlay, whilst in point of fact I believe he made no outlay whatever, but made the mine pay for its own development. "Engineer" gives little credit for the improvements to be effected in the management, &c. Now with respect to this, one need only mention the following facts:—All the work both underground and at surface is done at present by the day. Only one core per day is worked—from 8 a.m. to 4 p.m. There is no crusher nor apparatus for treating slimes. The reports say the mine is one in which tribute work can be introduced with advantage. "Engineer" carps and cavils at the questions respecting the size of the veins and the quantity of ore to be got from them, but it can be seen from the reports that the ore is found in deposits scattered, although more or less connected, throughout a large zone of eruptive rock; and, therefore, it is difficult to give any estimate, but it is known that with keeping up an active and extensive exploration a large and constant yield can be depended upon. The San Demetrio vein or zone, the reports say, has already given profitable deposits, and the hope is that larger ones similar to those in the old mine will soon be found. It is upon this hope in a great measure that those who understand the matter would make their investments.

Our critic next goes into deep calculations to make out the value of the mine, but although professing to be a mining engineer, it is evident he knows nothing of the business, as even a novice in the profession knows that the value of a mine depends upon many things besides actuary calculations, the principal being:—Importance and fitness of plant, extent and character of virgin ground to be explored, work necessary to start these explorations, and to carry on the whole of the operations with economy and efficiency; the actual reserves of ore, and the profit to be derived from it; the probability of making discoveries of importance, &c. Now, let us examine how these matters stand with respect to Monte Catini. The plant is said by all the inspectors to be the finest they have ever seen. There are 122 acres of freehold and 4000 acres of free mining right. The lowest estimate of reserve ore of first-class in 6000 tons, which from past data may be calculated to realise a profit of 8l. per ton, whilst there is also a large accumulation of low-class ores both in the mines and outside that can be treated profitably at the wash floors. So much for the actual value existing in the property, and for the prospective value, which must also be taken into account, it is shown that outside of the continuance of the old deposits in depth there is much ground to explore around these deposits in the upper workings that San Demetrio is a new zone lately opened, which now commences to give profitable quantities of ore, and that over the immense area in which mining rights exist there are numerous belts of eruptive rock of precisely the same character as that of the famous old mine. After giving due consideration to all these points, I would ask "Engineer" and the public, for which he professes to write, whether in modern times they have seen a mining property having such values brought forward at the price asked. I have no hesitation in saying they have not since the formation of the Cape Copper Company, with whose mines Monte Catini appears to have much in common.

Before concluding—in justice to the gentlemen who have brought the Monte Catini forward, Messrs. John Taylor and Sons—it should be noted. It appears they have watched the mine for years, and have had numerous inspections made of it, thus they cannot but be intimately acquainted with its value and capabilities, and surely

this, with their known experience and probity of character, should have saved them from the aspersions of your pretentious critic, and be a sufficient guarantee for the *bona fides* of the undertaking. I have trespassed somewhat on your space, but I am sure you will excuse it on the grounds of the importance of the subject. I would only add a hint to "Mining and Civil Engineer" that the next time he takes the trouble to look after the public interest in selection of investments he should take up some subject on which he can write with less ignorance or less maliciousness, and from which he can point a moral with something like justice and fairness.

Cornwall, Jan. 23.

A CAREFUL EXAMINER.

#### "MINING SCHOOL PUPILS."

SIR,—Under the heading "Great Southern Mysore Mining Company," the *Mining Journal* of Jan. 21 contains a very violent and unprovoked attack, signed John Lean, on the associates of the Royal School of Mines. Will the author of that attack be good enough to answer the following simple questions?—1. Of the many reports regarding the Indian Gold Mines which have appeared in the prospectuses of the various companies, how many have, to his knowledge, borne the signatures of associates of the Royal School of Mines, and how many have borne the signatures of men who, like Mr. J. Lean, claim to be practical men.—2. Of all the important mining failures of the last 50 years how many have, to Mr. J. Lean's knowledge, been started on the report of associates of the Royal School of Mines, and how many on those of "practical men."

In medicine, the Royal Engineers, the Royal Navy, and other professions which combine theory with practice, it has been long recognised that regular training and regular tests are an advantage and a security to the public. In nearly every civilised country the same view is generally held regarding mining engineering. And in all such countries the students learn certain things at a school, and certain others during their vacations, and after the completion of their course. Practical chemistry, practical mineralogy, practical geology, practical physics, practical assaying, taught in the various laboratories of the School of Mines, are surely not useless in Mr. Lean's opinion; and if the mining and metallurgy taught at the school seem to him useless, his notion of mining must be simply that of the working miner.—Jan. 23.

A. R. S. M.

#### LEADHILLS MINE.

SIR,—In September last I wrote you as to this mine, suggesting certain points which should be looked to. I showed that it was a small concern, putting out from 1000 to 1200 tons of lead yearly, that it had done so for many years, and that the probability was that it would continue at this output for many years to come, whoever was lessee. In December last a circular was sent among the shareholders stating some improvements that had taken place in the mine. Coincident with this the 6l. shares, which were selling at 1½, rose to 2, 2½. I notice also by the report of Saturday's Journal that the mine still looks well. I have stated on former occasions that I value the 6l. share at about 30s., and if anyone will turn to my letter of September he will see my reasons. Although I am a shareholder I do not wish the shares to become higher. They really are not worth it, and I think it right to give a note of warning that they may not be unduly raised by these reports and circulars. Is it not preposterous that the cost of the London management of this mine, the whole costs at the mine being 12,480l., should be 966l. 15s., which is made up as follows:—Directors' fees, 600l.; travelling expenses, 5l. 5s.; secretary, 200l.; auditor's fee, 10l. 10s.; commission on sales, 151l. This I presume is exclusive of Mr. Waters's salary. I notice also in the June report a sum of 249l. for interest and discount, 29l. for bank charges, and 138l. for income tax, which I should like to see explained. It is clear that if this were in the hands of a private individual the whole expense of managing the sales would not be 200l. a year, and it should not be more now, and why should there be interest?—Jan. 21.

R. T. M.

#### SOUTH DEVON UNITED COPPER MINES.

SIR,—Notwithstanding the letters that have been in the Journal from time to time pointing out the importance of sinking Pickstone's shaft, it appears there are very few shareholders who fully comprehend the fact that both of the shafts (Old Sump and Pickstone's) have pierced through the hard bar of ground, and below it a fine copper lode is opened. To judge of the importance of this fact the shareholders should distinctly understand that the old sump shaft is the most western shaft upon the property, and here the first course of ore was opened upon, and through which shaft all the ore produced at Emma Mine was drawn to surface. In this shaft the hard unproductive bar was first pierced about 124 fms. below adit, and the new course of ore intersected, carrying a rich leader of grey ore in the beautiful channel of ground which had been traced by coasting west. The water, however, was so quick that the pumping power would not admit of opening out the full size of the lode. At this point Captain Martyn, of Wheal Coates, was consulted, when he recommended that instead of erecting more powerful machinery for pumping and sinking the old sump shaft, that a new shaft should be sunk 70 fms. east of the old sump to take the lode at the depth of 140 fms., at which depth, from the dip of the hard bar, it would be passed through, and the new course of ore that had been seen at the old sump be again intersected. This work was carried out, and on cutting the lode at the 140 it was found to be 18 ft. wide, altogether a splendid lode, with ore throughout, but the foot wall for 4 ft. good work for copper, and the richer part at the bottom of the level. This was only 2 fms. below the hard bar, and too little height for driving a level for stopping the backs. It was, therefore, decided to sink another 10 fms., and have 12 fms. of backs. The lode altogether was such that it left no doubt of having at the 150 level a very rich mine. The lease had only a few years to run, and it was deemed advisable to obtain a new lease before the ore ground below the bar was further opened out. The new lease was applied for, but the lord's agents declined to entertain the application. It was, therefore, resolved to confine the operations to driving the cross-cut at the 58 fm. level to intersect the north lode, there being greater length of lease upon that part of the sett. This cross-cut was continued, and the south wall of the lode intersected, when such a flood of water rushed out that the driving could not be continued. This flooded both mines. Law proceedings followed from Lord Macclesfield and Brookwood Company, which ultimately ended by the purchase of both mines by this company. A new lease had been obtained for the water power, which led to the lord granting a most favourable lease for the whole of the two mining setts (Brook and Emma) at the low royalty of 1-24th. The intention then was to immediately follow the course of ore that had been met with at the old sump shaft and at Pickstone's, by sinking the latter shaft 10 fms. deeper as first proposed, and driving upon the lode east and west. This level would have gone on west below the hard bar of ground, and in the finest channel of clay slate for copper in the district all the way 50 fms. beyond the old sump, and in the eastern direction up to the Brook engine-shaft. This is more than 250 fms., and as there was scarcely a break in the course of ore above the hard bar of ground, there is every probability of its being continuous below the bar with a lode that indicates four times the productiveness in the finest possible channel of ground, 100 fms. thick. I have no doubt of this proving the richest mine in this part that has been discovered for the last 30 years in the two western counties. No such lode as is opened has been known to fail in such a channel of ground, and I do not fear to state that the hard bar of ground has acted like an elvan course upon the lode below it, and a similar result may be looked for as that of the Gwennap United Mines. I am induced to ask you to kindly find space for this letter, as I am desirous that those shareholders who have waited so patiently for years may hold on until the course of ore referred to is poured into the market under the system of dressing which is coming about, though not so rapidly as one could wish.

It is made plain by Capt. Nicholls that ore from this part can be placed on the market by the end of March next; it is for directors and shareholders to say if that shall be done, and the first dividend declared at midsummer. All this is possible, as the ore is there. It can be immediately worked, and continue to be worked, to the end of the present lease without wasting money to sink another shaft

150 fms., which will, when completed, be of very little use, in fact no use for working out the largest and finest courses of ore that are ever likely to be found in the mines. Nothing more is wanted but energy and practical ability to satisfy every shareholder who has bought at the very highest price quoted; and surely it would be a graceful act on the part of directors to give present shareholders a taste of the sweets after so long patiently waiting. As the Pickstone's shaft is determined upon to be sunk to come upon that course of ore, it remains for directors to say if it will be more agreeable to get the dividend at midsummer next, as would be the case upon Captain Nicholls's plan, or get it next midsummer 12 months upon the "crawling plan." It is time they decided this point—it is a matter in value of shares of 5l. each—at last, and I hope they will be pleased to find that their interest in the mines is none the worse for finding that any shareholder can realise and get his full purchase money back though he bought at the highest price. Having assisted them to obtain all they want to accomplish, such a desirable state of things, we shall see shortly whether they prefer a dividend or not, at the end of next June.—Jan. 26.

CHRISTOPHER ROBINS.

#### PILLATON MANGANESE MINING COMPANY.

SIR,—I see in last week's *Mining Journal* a letter headed "Pillaton Manganese Deposit," but by the context I find that it refers to the one at Pillaton. The misnomer, however, enables me to say that it is of similar geological formation to that justly celebrated mine. I am glad to be able to give a satisfactory reply to your correspondent. An agreement has been made with the lessees of the sett to purchase their interest, and a company is in process of formation to effect that end and to work the mine. I may add that the directors of the company are gentlemen who would not lend their names to anything that was not *bona fide*.—Jan. 23.

HUGH H. NEVINS, Secretary.

#### THE WHEAL VOR DISTRICT.

SIR,—It appears to me that New Great Wheal Vor and Great Wheal Vor are the great centres of interest down here at the present time. It appears samples of tin ore from both of these mines have just been assayed at Redruth, and from the report the subjoined is extracted:—"The quality of the metal is excellent, best refined. The difference between the two samples is hardly worth mention, but anything slightly in favour of Great East Vor." They contain no iron, nor any other detrimental substance in any noteworthy degree. This is important, and the fact of the sampling having been only partially cleaned gives it greater significance. Of course such tin would command the best standard, and well dressed would, no doubt, make a good produce. The samples were only roughly cleaned on a vanning shovel before being assayed, therefore the results do not enable us to say what the produce of the ore would be when properly dressed in a larger way for the smelting house.

They appear to be progressing rapidly with the works in both these mines, and in sinking deeper they come upon stronger and richer deposits. As to Great East Vor, the impression is that the two lodges now being worked will form a junction at a little lower depth, and will then turn out a true champion lode. I heard a mining man of repute say the other day that the discoveries in these two mines are the greatest discoveries in tin that have been made in Cornwall for the last 30 years.—Helston, Jan. 24.

HUEL.

#### GREAT DISCOVERY OF SILVER-LEAD ORE AT THE BWLCH UNITED MINES.

SIR,—As I was returning home from business on the 24th inst. about 7 P.M., I happened to pass by the above mine, and saw some miners by the office with lighted candles in their hands; and, wondering what it meant, on my arrival and to my great surprise I ascertained that another discovery of silver-lead ore had just been made. The miners and manager were fully engaged inspecting the large specimens that were then brought out. Those specimens which I saw were from 4 to 6 in. wide, of solid rich silver-lead ore, and upon further enquiries I was informed that it came from the old Roman lode, now called the Marvin's lode, and that this discovery is in a section of unexplored ground. I was also shown some rich rocks of silver-lead ore, which have been recently discovered in the eastern part of the mine, and I could not help admiring the specimens, they being of such a rich character. I was highly pleased to see that this mine is progressing so favourably, and I am sure great credit is due to the company and manager for their persevering manner in the development of the mine.—Jan. 26.

PASSER BY.

#### SHROPSHIRE LEAD MINES.

SIR,—The activity here as regards the work being done and the lead ore being sent to market during the dull times we have been passing through in this part of the country lately, will compare very favourably with any other district; and there are evidences that as the district becomes better known to mining gentlemen it is more appreciated. The Snailbeach Company, we understand, will soon be ready to use boring machinery, and explore their extensive sett much faster than by hand boring. Their man-engine is a great advantage both to the company and the men. They have a rich mine in the old lode, and if the side lode and parallel lodes turn out as good as the old lode their future will be a great one indeed. And we fully believe that there is a great future before the Tankerville Great Consols Mining Company. A great deal of important work has been done since the company first started on the Bog and Pennerley mines, and a considerable amount has yet to be done before they can show what their mines are capable of returning. However, it is very evident that that desirable state of things will be brought about as early as possible. Myton Dingle sett lie between the Snailbeach and Tankerville Great Consols, and is a fine piece of mineral ground. It is impossible to wish a mine in a better position than this is, and the lead ore discovered near the surface, it is said in paying quantities, is very inviting to capitalists, and we hope the London company who are taking it up will find it as rich as it is believed they will by all the miners here who know the mines. There are two or three other good mining properties being taken up where very valuable discoveries will most probably be made with small outlay, by proving the lodes known to be running through them. Operations are already commenced on some of them, so that we consider the outlook to be satisfactory, and we anticipate plenty of employment for the miners and good profits for the companies. A SHROPSHIRE MINER.

#### MANUFACTURE OF TIN AND TERNE PLATES.

To simplify and improve the manufacture of tin and terne plates an improved arrangement has been suggested by Messrs. TRUBSHAW and LEYSHON, of Llanelly. They dispense with the pot or vessel containing melted grease, and commonly called the tinman's pot; they also dispense with the vessel containing melted tin or terne metal, and commonly called the tinman's pot; and with the soaking and dipping pot, commonly called the washman's pot. In place of the several vessels described, and the ordinary treatment therein of the plates to be coated, they employ a vessel of a special form, and carry on the process in a very simple manner. The pot or vessel is divided into two or more compartments, and they either employ tin or terne metal in all the compartments, or employ grease in one of the compartments and metal in the others. In the compartment in which the plates to be coated are first treated is a division extending from the top to such a distance downwards that its lower edge is during the working always below the surface of the melted metal. This compartment contains tin or terne metal, and on the surface of the metal on the outer side of the division a layer of rosin and tallow or other flux is put. On the surface of the metal, in the inner side of the division referred to, is a layer of tallow or palm oil, and a candle is fixed to raise the plates out of the metal, the plates being then drawn through brushes fixed at a convenient height above the metal. The other compartment contains either tin or terne metal or grease, and also contains an arrangement of plain iron or steel rolls.

After the plate to be coated has been cleaned by the ordinary pickling process it is immersed in the outer portion of the first com-



partment. The plate first passes through the grease or flux on the surface of the melted metal into the melted metal, and is passed under the division into other portion of the first compartment. The coated plate is drawn from the melted metal in the inner portion of first compartment, and is passed into the second compartment containing metal or grease. The plate is directed so as to pass between the rolls contained in this compartment, and on its removal from this compartment required only to be treated by the ordinary cleaning process. It is claimed that by this invention the manufacture of tin and terne plates is simplified, labour economised, and the injury to the plates, which frequently results in the ordinary method of manufacture from the long exposure of the plates to the action of the melted metal, is avoided.

## REPORT FROM CORNWALL.

Jan. 26.—Notwithstanding the very satisfactory figure to which the tin standards have now advanced, there does not appear to be any prospect of animation in the share market, and there is hardly a mine of any reputation now which is on the market at a price representing its real current value. It is not very easy to account for this. There certainly is no lack of money, and good investments are as much in request as ever. Only two causes seem probable to us. One of these is the attempt to "bear" tin mining property, which we recently alluded to in connection with the evident effort to exalt the prospects of Australia, and get up another small scare in that direction. The other is the evil effort which has been produced by the unsatisfactory results of several "limited" speculations. There are people in the world who very illogically continue to believe all that the "limited" advocates say against the Cost-book System, even after their own "limited" experience should have taught them better. It is a case of "once burned twice shy," and Cornwall has to suffer for the acts of outsiders. Some little while ago it was quite true that no material advance was fairly to be expected, because to a certain extent the prospective advance in the tin standards had been discounted. This is not the case now, mining property generally is selling under value, and as there are no conditions in the metal market to indicate a reaction, intending investors, notwithstanding all that is said and done by interested parties around them, are not likely to find any profit in delay. Ere long in the nature of things we must see a decided upward move.

The Royal Cornwall Polytechnic Society has held its annual meeting, under the presidency of Canon Rogers. The proceedings were of a highly satisfactory character, and showed the society to be in a thoroughly flourishing condition. The next exhibition will be the 50th that society has held, so that this is the jubilee year. Following out the idea of the president it is intended to make the next exhibition so far as possible a record of progress—particularly in connection with the work of the Polytechnic over the last half century—and it was determined to appoint sub-committees for the purpose of carrying the scheme into effect—mining, general mechanics, mineralogy, and chemistry will be among the special departments. A suggestion was also made for the holding of a permanent exhibition in these departments of science which it is specially worked to encourage, and to form classes of instruction in various scientific subjects. These latter proposals will be considered and reported on at a future meeting. Meantime the preparations for the exhibition will forthwith commence. There could not be a more interesting feature so far as mining is concerned than a comparative display of old and new appliances, and we throw out the hint for the benefit of the managers.

Mr. J. J. Beringer, lecturer of the Miners' Association, has just concluded some experiments at Carn Brea Mine with the ventilating apparatus of Capt. W. Teague, jun. In a report on the results he says the first trial was made with the steam jet, the steam being at a pressure of 45 lbs. to the square inch. The apparatus was fixed at one end of a level 60 ft. long, and with an area of 19 square feet. The air was drawn through with an average velocity of 377 ft. per minute. The natural current—40 ft. per minute—assisted, and allowing for this the work of the apparatus was 6400 cubic feet of air per minute. The second trial was with a blast of air at a pressure of 60 lbs. to the square inch. The apparatus was fixed at one end of a boiler, 30 ft. 8 in. long, and with an area of 11 square feet, blowing against a gusty wind, which had perhaps an average velocity of 300 ft. a minute. The velocity of the air drawn through the boiler was 728 ft. per minute. This gave as the work of the apparatus 8008 cubic feet of air per minute. To this, however, should be added 334 cubic feet as the effect of the wind acting on the mouth of the ventilator, which had an area of 1069 square feet. This gives 8342 cubic feet of air as the work of the machine per minute. It will be recollected that Capt. Teague has also designed a series of ventilators to be applied to chimneys, and some of them are in use in the county, the results being considered satisfactory.

So far as we can see the prospects of what may fairly be called progressive mines are very encouraging, since most of them are opening out well, and several ought before the end of the year to add their quota to the Dividend List. We say "fairly" so-called, because a good many reported progressive mines are more likely to follow the example of certain of their associates, and progress into the Starvation Court than anywhere else. Last year's crop, especially of "limiteds," is very far from being yet weeded out.

## TRADE OF THE TYNE AND WEAR.

Jan. 25.—The Coal Trade, on the whole, continues fair all round. The steam coal works have been kept fairly going during the past week, but there has been a little slackness in some quarters owing to the detention of vessels at sea, and this has been caused by heavy fogs in the Thames and on the south coast. The prices for best steam coals have improved a little, and prices are generally firm. In the steam coal trade a large business has been done during the past three months, much more than the ordinary business at this period of the year in foreign exports, and this is owing to the general mildness, or rather absence, of the winter. It is now expected that there will be some slackness in the trade for a time until the spring trade to the Baltic, &c., opens, when a good trade and better prices are anticipated. Contracts for this coal, it is expected, will be made in February at increased rates; at all events a determined stand will be made to effect this purpose, and this course is warranted by the increasing demand, and the price of best steam coal at Cardiff and South Wales generally. The demand for steam small coal is improving considerably, partly owing, as we have lately pointed out, to the increased use of the coal for river and ocean steamers. The gas coal collieries in Durham continue to be well employed, and the shipments of this coal at Tyne Dock and other leading shipping ports on the Tyne and Wear continue large. The house coal trade is rather quiet. At present the demand for inland consumption and for shipment having declined a little owing to the mild weather. The demand for coke continues very strong; no stocks of any consequence are now held. The daily make is, indeed, cleared off very quickly, and as improved rates have been secured in many cases for contracts, the proprietors of coking works are encouraged to increase the make by extending their works above and underground. The strike of miners at the Ushaw Moor Colliery still continues, and the men appear to be determined to remain in the locality and prevent if possible the introduction of new hands to work the pits, and as they are well supported from the funds of the Union, and also by contributions from various collieries, they can no doubt remain out for an indefinite period. But this is hardly fair to the owner of the works—Mr. Chaytor—as the men tendered the notices to leave, and there is no doubt that all of them could find work at the Durham collieries if they wished to do so. There is no prospect at present of the matter in dispute being referred to arbitration, which is much to be regretted, as the dispute might certainly be ended shortly by a little concession on both sides.

The pig-iron trade has been very quiet during the past week. The discouraging accounts from France and the Continent, and the panic on the French Bourse has had a damaging effect to some extent on the coal and iron and other trades here. The price of pig-iron has been considerably weaker, the speculative element having again appeared since the fall in the price of Scotch pig-iron. There is really

no sound reason for the fall in the price of pig-iron at present, as the demand for local consumption continues very strong, and it is likely to continue so. Merchants still quote 43s. for No. 3 prompt delivery and makers quote 43s. 9d. to 44s. for delivery up to May and June next. Some orders have been received from America, and the shipments continue satisfactory for the time of year. The manufactured iron trade has been rather quiet during the past week, but there has been no relapse in prices. Ship-plates are still 7l. 5s., and other makes of iron in proportion. Puddled bars are 4l. 7s. 6d. Manufacturers are fully employed, especially ship-plate makers, for several months to come, and every available means of production is pressed into service. There is a great demand for nuts, bolts, &c. Steel of all kinds continues in very good request. The iron shipbuilding works on the Tyne and Wear continue to be fully employed, and the minor engineering works and factories are also well employed. The new engineering works belonging to the North-Eastern Marine Engine Company at Low Walker are being pushed forward with great vigour. The new works of Messrs. Hawthorn, of Newcastle, are also considerably advanced, and no time will be lost in getting into play the rolling mills, &c., which are to be started on the old site of the Walker Ironworks of Losh, Wilson, and Bell, which were formerly the most extensive general ironworks on the Tyne.

Swan's electric light has been introduced into the establishment of Messrs. Coxon in Newcastle, apparently with success. Otto's silent gas engine has been put down to supply the power—an eight-horse engine capable of being worked up to 14-horse power. The light is brilliant yet soft and agreeable, superior to gas light in every respect; and should it compare favourably with gas light in economy there will be no longer any doubt that electric lighting will be extensively adopted. It has been already introduced into some of the large engineering works on the Tyne with the best results. The new company formed in Newcastle, under the direction of Mr. Swan, have already executed a considerable amount of work, and are now actively engaged in preparing the apparatus, globes, &c., required for the execution of several important contracts. There is little doubt that electric light will ultimately be extensively used for street lighting, and also for lighting private dwellings to a certain extent. The effect would probably be a considerable reduction in the price of gas, the use of which would be extended for cooking, heating, driving small engines, &c.

The chemical trade again appears to be gloomy; the attempt made a short time ago to reduce the make has not proved altogether successful. The quantity of chemicals produced is still too large for the requirements of consumers, and prices are consequently unsatisfactory. It is probable now that this will go on until the fall of some more of the weaker makers takes place, and thus the production will be reduced. Some men experienced in the trade, and largely engaged in it, hold the opinion that foreign competition has to a great extent caused the great depression in this trade here at present, that new processes have been invented and carried out in Belgium and in other countries on the Continent, and that those inventions have placed chemical manufactures here at a disadvantage, and that makers must sooner or later introduce those processes referred to before they can regain the position they have lost.

At Middlesbrough Exchange, on Tuesday, there was a good attendance; the disturbing political news from the Continent, more especially from Austria, was much discussed. There was very little animation about the market, and prices were very unsettled for some time; makers, however, would not quote less than late rates, and merchants did very little business. Messrs. Connall's stock is 176,236 tons, an increase of 122 tons on the week. The shipments of pig-iron in January have been large. The manufactured iron trade shows large results; the total output is now nearly equal to the palmy days of 1873, though ship-plates now occupy the highest place in the production. There is in addition the large steel industry, which did not exist at that period. The output of steel by the Thomas-Gilchrist process is being considerably augmented; it now exceeds 2000 tons per week at Bolckow, Vaughan, and Co.'s works. No change of consequence in the quotations for pig or finished iron. Coal and coke keep pretty steady.

IMPORTANT MINING LEGISLATION.—Intimation has been received by the various mining association here that the Home Secretary will receive a deputation in London on Feb. 2 to discuss the necessity of a new mines Bill, giving power to miners to appoint and sustain their own check weighman, also for the better and more efficient inspection of weighing machines, and other important mining regulations. All the leading mining districts will be represented.

## REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Jan. 26.—This week there is a good demand at 9s. 6d. per ton for best Thick coal in cases where the pits are favourably situated in relation to consumers' works. But less valuable coal was in excess of demand. Ironstone is selling fairly well, and better prices are being realised. Pigs of foundry sorts are selling well. Raw iron of an irreproachable quality approaching in value cold blast pigs secured at the meetings of the trade this week good rates. Cold-blast pigs were 4l. 10s., and cinder (or common) sorts about 2l. 7s. 6d. per ton. Hematites sold fairly at firm rates. As to finished iron, bars varied from 8l. 2s. 6d., the price of the Earl of Dudley, and 8l. that of John Bradley and Co. to 6l. 17s. 6d. for common sorts. Hoops were 7l. to 7l. 10s.

The colliers in the Cannock Chase district have been informed by their Union agent of the action during the past two months of the Board of Conciliation. The agent states that, as previously arranged, two accountants have been appointed—one for the employer and one for the employed. They have gone through the books at the whole of the collieries in the district, and from their report it appears that the average price of coal for the month of October was 6s. 1d. per ton. This is to form the basis of the agreement to be entered into by the masters and men. The minimum wage will be 2s. 4d. per day. The representatives of the men have discussed the questions, and have determined that a rise of 3d. per day is a fair amount to give the men of a rise of 1s. per ton on the average selling price of Cannock Chase coal. These figures have been laid before the employers, and they have promised to get out a basis, and present it at the next meeting of the Conciliation Board. It is also decided that if the agreement is entered into it shall remain binding for twelve months certain, and then be subject to six months notice on either side.

The mass meeting of ironworkers, held at West Bromwich a fortnight ago, to consider the proposed alteration in the wages sliding scale has been followed up this week by a gathering of the men at Brierley Hill. A long address was delivered by Mr. James Capper, the operatives' secretary, to the Wages Board, who deprecated any movement for abolishing the scale, and in answer to a few of the men at the meeting who expressed their liking for a "big strike" Mr. Capper said that if a strike occurred the ironworkers would have to act without him, for he too well knew the disastrous effects of strikes. He would rather the men went forward with the growing intelligence of the age. It was ultimately resolved that, as was determined at West Bromwich, notice should be given to the employers for the reconsideration of the scale, so that the net average price which regulates wages might include all classes of iron, instead of as now only bars, and that wages should be 1s. in advance or equal shillings to pounds, as representing the net average selling price, instead of as at present only 6d. in advance.

## REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Jan. 26.—Some of the proposed railways in Wales seem ill-fated. Complaints have been filed as to the non-compliance with Standing Orders in the case of the Oswestry and Llangynog, the Wrexham and Connal's Quay Extension, and the Manchester and Milford Bills. The Liverpool Corporation have gone in at last in good earnest for a narrow gauge railway from Llanfyllin to the works near Llanwdyn. The line will be 12½ miles long, and although the summit of the line will be 800 ft. above the former place the deepest gradient will be 1 in 42.

An unfortunate accident occurred at the Hanwood Collieries, near Shrewsbury, a few days since. The rope broke when the cage was

about 5 yards from the bottom of the shaft. The men were badly bruised, but happily no lives were lost. These collieries are vigorously worked by Mr. Atherton in the upper coal measures, and they are about the only collieries at present successfully worked in those measures in South Shropshire. An attempt was recently made by boring to reach the middle and lower coal measures in one of the pits here. The rods had just reached the summit of these when it was found impossible with the appliances at hand to go deeper, enough was, however, proved to justify the sinking of a shaft, which I hope will be done. The winning of these middle and lower measures would be a wonderful addition to the mineral resources and wealth of the district. In lead mining there is little to notice this week.

## TRADE IN SOUTH WALES.

Jan. 26.—The activity of the South Wales ports is well shown by the shipment at Cardiff of 129,996 tons of steam coal abroad last week, while Newport, which has been labouring under some disadvantage in consequence of the blockade in the waterway, which has now been removed, has sent away 23,741 tons, and Swansea 25,446. There has been some discussion lately as to the probable exhaustion of the Welsh steam coal valleys because of the immense output, but that idea may be cast on one side when it is stated that there are miles of virgin soil laden with coal yet untouched, and that no one at present existing is likely to see the end of it; to which may be added the fact that new discoveries of coal are made every now and then, which more than recoup the quantity raised to the surface. There are under the estate of Mr. Talbot, M.P. for Glamorganshire, no less than 2200 million tons of coal, little of which has yet been touched. Mr. Robert Hunt's estimate for the South Wales coal field, made a few years ago, was 37,500 million tons, but that amount may probably be now stated at 25 per cent. more. The quantity raised annually in all South Wales and Monmouthshire is not more than 20 million tons. As regards the make of iron and steel, the alterations at the works show that fresh energy is being infused into all the undertakings. At Cwmavon a new furnace, 50 ft. high, was started last week, and it is estimated that 300 extra hands will be employed by this furnace alone. At Rhymney last week there was an output of crude steel in five days of 2350 tons. The works at Cyfarthfa show that the idea of making steel at no distant date has not been abandoned, and the Pentyrch works will go on again after the various extensive alterations resolved upon has been made. The amount of iron sent abroad last week from Cardiff was 1725 tons, and iron ore was received to the extent of 11,130 tons from Bilbao, and 205 from other places. The attention of all eyes has been turned during the past week to Milford, where a powerful syndicate of British and American capitalists, consisting of Sir E. J. Reed, K.C.B., M.P., Admiral Sir W. Hewett, V.C., Sir Charles Whetham, Mr. Pullman (of car notoriety), and many others, have resolved not only to make docks, but to shorten the distance between London and New York by forty hours, so that passengers leaving London on Monday morning may set foot in New York on Saturday night. The magnificent sheet of water, ten miles long and two broad, known as Milford Haven, has long been famous, and although the late Colonel Greville spent 70,000l. in opening up its resources, the speculation proved too vast for the capital of one man. The dock company has embarked upwards of 500,000l. in the enterprise, and land in the vicinity has been bought up to the extent of three millions, upon which large hotels will be erected, while Mr. Lorillard has undertaken to provide a line of steamers which, by being covered in Noah's ark style, will be able, it is anticipated, to plough their way through the Atlantic in the roughest weather.

## SOME REMARKS ON THE PROFITABLE EXTRACTION OF GOLD FROM SUPERFICIAL DEPOSITS IN WILD TROPICAL COUNTRIES—No. VI.

BY GUSTAV JULIUS GUNTHER.

To some of your readers the number of trial pits indicated in the diagram III. in No. V. may possibly appear great, and the pits themselves may appear somewhat crowded, but then it should be borne in mind that these pits are not sunk all at one time, but that the first ones may be sunk at greater distances from each other according to the nature of the ground and the convenience of the spot. Some pits may be sunk in or near the bottom of a valley or ravine, others higher up on the top of a hill, in order to see whether there is a difference in the yield according to the difference of height at which the respective spots are situated, &c. The pits in the interspaces may be sunk afterwards for the purpose of a more detailed exploration. The large number of trial pits, all properly classified, offer many advantages. We obtain thereby a general thorough "overview"—birds-eye view, as it were—of the mode of distribution of gold throughout the whole ground, and, as nearly as possible, of the shapes and situations of those portions or zones which vary amongst themselves in yield; or, if I may thus express myself, comparing the whole ground to a picture, we see at one glance all the differences in the shades of richness, and in accordance with such a variety in the yield, the whole run of gold-bearing ground would be divided into various sections. While doing so we would take at the same time the surface configuration of the ground into consideration, as well as also whether the ground ranges from richer to poorer, or vice versa, gradually or suddenly, and in which direction, and under which circumstances (nature of composition, degree of decomposition, nature of the barren country rock on both sides, &c., being always carefully investigated). I leave it as an open question whether or not we might in this way be enabled to guess at the causes of such changes. We should in this way gain a well-defined and reliable base upon which to found the plan of our actual operations of extracting the gold in the most efficient, thorough, most economical, and hence most profitable manner possible. It is clear that these trial pits are, comparatively speaking, shallow, but wherever we should find a continuation of richer ground to greater depth there we should, of course, follow it up, as such discoveries must have an important influence upon the selection of the spots where plant, &c., of a more permanent nature would have to be placed.

The selection of the site where our plant (crushing, dressing, &c., works) is to be erected is a matter of the very highest importance. Although I intend treating on several kinds of mining and reduction apparatus, specially recommendable in our case, on some future occasion, I may as well remark already here that during my many years' experience I have observed numerous instances where the reduction works were put up in positions not at all favourable to the labour-saving, and hence the profitable working of the mine—a circumstance which constituted a permanent source of misgain and loss to the concern. I have observed this to be the case in works belonging to private individuals than in works belonging to public companies, and I believe that perhaps the cause of this is the circumstance that the latter are always in too great a hurry to get on as fast as possible, so that a good account may be given to the shareholders at the very earliest opportunity possible. This precipitation, this absence of a consideration that first carefully weighs and investigates all the circumstances attending the case, has contributed and is contributing in many cases towards losses or failure. In this respect—that is to say, in the properly placing of the reduction, &c., works—the strictly systematical method which I have suggested of first surveying, strategically, as it were, the whole of our field of operations before proceeding to any tactical action, would again offer us very great facilities for formulating our plans in the most advantageous way possible placing our reduction plant in locations to which the mineral that is to be operated upon could be conveyed in the easiest, simplest, and cheapest manner possible from all parts of the mine, and for all time—that is to say, so long as the mine remains workworthy. In a case I had to deal with in South America the object of mining operations was an auriferous rock channel traversing a valley. It was the very highly decomposed and settled down back of a channel of laminated greenstone, which in depth changed in colour, grew much harder, contained throughout its mass pyrites, but was there exceedingly poor in gold.

Stamps were erected on one side of the valley, but after they were completed it turned out that the stuff obtainable on that side of the







without foundation was proved by the report of several failures in the City, and we understand being reported yesterday, and about the same number to-day. Canadians are lower, and have had some fluctuations, but close to-day. Americans, with the exception of Philadelphia and Readings, have their worst. Americans, as a rule, are easier, also they, too, have rallied from lowest point.

**HULL.**—Mr. W. FOWLER SUTTON, stock and share broker, St. Mary's Chambers (Jan. 26), writes:—Extreme flatness has characterized all the stocks of late, and the fall has been very severe all round, but especially in the foreign stocks, which have been the favourite speculative media in Paris, notably Egyptians. Every effort is being made to mitigate the disasters on the Paris and other Bourses, and it is possible we have seen the worst, but until the financial atmosphere is a little clearer it is advisable to let the foreign markets alone. Yesterday English rails had a general and very sharp rally, probably on "bears" closing; any further advance, however, is unlikely until after the next Paris settlement, but if this is the case over safely a determined rise is almost certain. The foreign market has also rallied somewhat, but the improvement cannot be relied on. American stocks have to some extent been affected adversely in sympathy with the tone remains very uncertain. Local stocks generally firm. Hull Docks, 27; Yorkshire Bank, 27; London and Yorkshire Bank, 41. Hull Docks, 27 to 31; this company pays dividends for the past year at the rate of 3½ per cent. per annum, against 4 per cent. last year. Hull Tramways 3; Earle's Ship-building, 24; Hull Gas, 55; Hull and Barnsley Railway (2½ paid), 1.

**NEWCASTLE-ON-TYNE.**—Messrs. J. S. CHALLONER and SON, stock and share brokers, Dean-street (Jan. 26), write:—Consett Irons rather weaker, at a fall of ½, to 18½ prem. Palmer, B. shares again show an improvement of ½, to 21; and A shares 1½, to 30½. Darlington Irons ½ better, to 37. 18s. 9d. per share. West Cumberlands ½ lower, to 13½. Teesdale Iron remains 2½; preference, 2½; Bolckow, 20½ paid, 20; 12½ paid, 17; Barrow Steel, 130; Chillingworth Iron, 3½; Lawes, 5. Langdales better, at 3½; North-Eastern Banks, 4½ to 4¾.

#### SCOTCH MINING AND INDUSTRIAL COMPANIES SHARE MARKETS.

**STIRLING.**—Mr. J. GRANT MACLEAN, sharebroker and ironbroker (Jan. 26), writes:—During the past week the markets have been depressed, owing to the financial news from Paris and Vienna. At home, however, the prospects are all in favour of improvement, as trade is generally active, so that it is possible during the current account (Feb. 15) the depression will be got over, and investors should not miss any opportunities of getting in at low prices.

In shares of coal, iron, and steel companies, the principal business has been in Marcellas, which have improved 3s. 6d. to 6½, on dividend being expected at 4 to 5 per cent. In the Scotch pig-iron market the price of warrants has declined from 51s. 6½d. to 50s. 7½d., but have since recovered. Home trade is active in nearly every kind of finished iron, and the open weather is favourable for trade both at home and abroad. It is stated that American purchases of iron are being renewed. Blisdon and Crump Meadow Colliery are at 32s. 6d.; Chatterley Iron, 8½ to 9½; Calow Colliery, 50s.; Darlington Iron, 7s. to 8s.; Llyvi and Tondur (preference), 70s. to 80s.; Newport and Abercrom Colliery, 50s. to 60s.

In shares of foreign copper and lead concerns a large business has been done, but prices have been flat. The copper market, however, is now looking better, which should tend to firm prices as soon as the present pressed sales are completed. Tharsis declined from 44½ to 42½, but have recovered about one-half of this. Rio Tinto touched 23 and Paucillo 5½. Canadian are at 27s. to 28s. (then 25s.); ditto 8 per cent. debentures, 97 to 97; Copiapo, 60s. to 61s. 3d.; Huntington, 45s. to 42s. 6d.; Santa Cruz, 10s. to 12s. 6d.; Virneberg, 11s.; and York Peninsula (preference), 17s. 6d. to 22s. 6d.

Shares of home mines have been dull, owing to the decline in the tin market. Bedford Colliery are at 27s. 6d. to 32s. 6d.; Carpell, 5s. 3d. to 10s.; Carr Cambrone, 10s. to 15s.; Cambrian, 5s. to 10s.; Devon Friendship, 10s. to 15s.; Drakewalls, 10s. to 15s.; East Roman Gravel, 12s. 6d. to 17s. 6d.; East Gravel Moor, 5s. to 10s.; East Van, 15s. to 20s.; East Devon Consols, 30s.; East Wheel, 15s. to 17s. 6d.; Gunnialake (Clitters), 55s. to 65s.; Great Holways, 2s. to 5½; Herodsfoot, 5s. to 7s. 6d.; Hington Down, 20s. to 25s.; Indian Queens, 2s. to 7s. 6d.; Killisreth, 30s. to 40s.; Langford, 7s. 6d. to 10s.; Lady Ashburton, 2s. 9d.; Mounts Bay, 12s. 6d. to 17s. 6d.; New Kitty, 45s.; North Molton, 2s. 6d. to 5s.; North D'Esty, 20s. to 25s.; Old Shepherds, 10s. to 15s. 6d.; Old Oveland, 15s.; Pioneer, 12s. 6d. to 17s. 6d.; Pantymwyn, 7s. 6d. to 12s. 6d.; Phoenix United, 65s.; Pandora, 10s. to 15s.; Penryn, 18s. to 20s.; Penryn, 50s. to 70s.; South Crebor, 5s. to 10s.; Silver Hills, 10s. to 15s.; South Francis, 15½; South Condurrow, 10½; Tamar, 12s. 6d. to 17s. 6d.; Tin Hills, 12s. 6d. to 17s. 6d.; Treasavans, 1s. 3d. to 3s. 9d.; Vincent Tin, 20s.; West Lishorne, 15s. to 20s.; West Devon Consols, 7s. 6d. to 12s. 6d.; West Phoenix, 20s.; West Polbrene, 28s. 3d.; West Kitty, 3½; Wheel Hony, 30s. to 40s.; Wheel Crebor, 60s.; Wheel Fortune, 15s.; Wheel Jane, 25s.; and Wheel Owles, 2 to 11.

In shares of gold and silver mines the principal alteration is a decline in Richmond to 11½ sellers. Glasgow Gold have improved 1 to 11; Akankoo, 5s. to 10s.; Anglo-California, 3s.; Colombian Hydraulic, 5s. to 10s.; East Sheboy, 3s.; Eschequer, 2s. to 4s.; Great Southern of Mysore, 5s. to 10s.; Indian Gold Coast, 5s. 6d.; Indian Phoenix, 11s. 3d. to 13s. 9d.; Indian Consolidated, 10s. to 15s.; I.X.L., 2s. to 4s.; Indian Kingston, 7s. 6d. to 10s.; London and California, 3s. Mysore Reefs, 5s. to 7s. 6d.; New Callao, 2s. 6d. dis.; New Gold Reef, 7s. 6d. to 12s. 6d.; Quartz Hill, 3s. to 5s.; Rhodes Reef, 10s. to 12s. 6d.; Simons Reef, 7s. 6d. to 12s. 6d.; and Utah Silver, 2s. 9d.

In shares of oil and miscellaneous companies prices have in some cases improved, but business has been quiet. Glasgow Coal Exchange are 20s. to 25s.; and Montrose Slate Quarries (Debentures), 5.

**EDINBURGH.**—Messrs. THOMAS MILLER and SONS, stock and share brokers, Princes-street (Jan. 25), write:—The difficulties on the Continent have caused a dullness in the market during the past week. Home Railway stocks have had a considerable fall. Caledonian has receded from 111½ to 109½, North British from 95 to 93½, Glasgow and South Western from 122½ to 122, Great North of Scotland from 63½ to 62½, Highland from 105½ to 104, London, Chatham, and Dover from 29½ to 28½. English railways are generally from 1 to 3 per cent. lower. Caledonian Railway 10 per cent. preference No. 2 has been offered at 103½, a reduction of ½, and Highland Four per cent. debenture stock has fallen from 107½ to 106½. Notwithstanding a definite statement to the effect that rates had been arranged between the competing American Trunk lines, Canadians and Americans have fallen in sympathy with other stocks. Grand Trunk Ordinary has receded from 17½ to 16½, the second preference from 82½ to 80½, and the third from 35½ to 34½. Lower prices than these were at one time reached, but to-day an appreciable improvement has taken place with the opening of the new account. New York, Pennsylvania, and Ohio first bonds have receded from 47½ to 46½, and the third from 9½ to 9. Erie from 43½ to 41. Reading shares have improved from 31½ to 32½. Bank of Scotland has receded from 290 to 288. British Linen from 275 to 275. Union from 25½ to 25. There have been no changes worth mentioning in insurance shares. Canadian Copper shares have receded from 28s. 6d. to 28s., Clyde Coal from 6s. to 6s., Huntington Copper from 4s. 6d. to 4s., Rio Tinto from 27 to 24, Tharsis from 44½ to 43. Uphall Oil have improved from 8 to 8½. Broxburn Oil have receded from 28½ to 28. Edinburgh and Leith Gas have declined from 32½ to 31½, Fife and Forth from 10 to 9½, and the new shares from 6 with 14. per share paid to 7½ with 3½ paid.

#### IRISH MINING AND MISCELLANEOUS COMPANIES SHARE MARKET.

**CORK.**—Messrs. J. H. CARROLL and SONS, stock and share brokers, South Mall (Jan. 25), write:—Markets were a shade duller to-day, and Great Southern changed hands at 109; no change in Midlands or Randons; but Limericks were done at 35½, and passages were asked for at 9½. National Banks were done at 23½, and Munsters at 15; Hibernians also changed hands at 41½, and Provincial at 54. Cork Steam Dockers were again enquired for at last price, and Lyons shares at 41. Gas shares are 6½ to 6½; Goudings, 8 to 8½; and Harbour Board debentures 102½ to 102.

#### COLAR GOLD MINING COMPANY.

The report of the directors prepared for presentation at the meeting on Tuesday submits the balance-sheet to Oct. 31, showing that 75,000 shares have been issued, and 50,448½, 5s. 3d. is considered as paid thereon. The total payment for purchase of the mining rights including the 25,000 shares considered paid *per contra*, was 35,000£. For wages, salaries, stores, and working expenses, and for cost and freight of machinery from England, and travelling expenses of officials and workmen to India, 11,823½, 1s. 10d. was paid; the London management cost 12,841, 2s. 7d.; office furniture 140£, 5s. 7d. and law charges, including stamps, 4s. on title deeds 509£, 4s. 10d.; leaving a cash balance of 16,317, 10s. 5d. Only one-half of the capital, 75,000£, has been offered for subscription. The report continues:—The purchase of the company's property was duly completed after investigation of the title, and the lease registered in India. The company had the option of taking an adjoining block of 320 acres of land, but in respect of 200 acres this option was relinquished, in consideration of a cash payment of 500£. A scheme for the purchase of the remaining 160 acres met so little favour from the shareholders that the directors abandoned it, and the 500£, in hand has been used in further development of the mine. The board were thus enabled to carry on the business until the call payable on Nov. 10.

July 13 the proprietors were given details of the plant, machinery, &c., forwarded to the mines. Since that time various other requisites have been forwarded to India, and amongst them a small shipment of timber, which the directors considered could be delivered at the mines at a less price than that paid for native timber, and they have the pleasure to state that their anticipations were fully realized, a saving of at least 50 per cent. having been effected. Capt. Roach having mentioned that the timber was of excellent quality, and most suitable for his requirements, a further and larger consignment has recently been forwarded. The workings of the Mysore Gold Mining Company (whose shares will be seen from the plan, adjoins that of your company) show that there are at least five well defined lodes, all of which it may confidently be asserted will be met with on your property. At present Capt. Roach is only working on three lodes, and from his reports it will be noticed that in No. 2, main, cross-cutting west, he is driving north and south on what appears to be very good stone, and which in the course of excavation he is sending to surface. Samples of this stone have recently been received.

The directors attach but little importance to assays, and knowing that it would be far more satisfactory to all concerned to have the result of actual crushing at the mines, have instructed Capt. Roach, as soon as he is in a position, to stamp at least 100 tons of the stone he is now raising; so that they may be able to form an opinion of the value of this particular lode. The board do not contemplate any great results from this trial crushing, as the stone to be treated is found at no great depth, and the experience of their neighbours shows that the stone increases in richness with depth, a fact confirmed by the recent report of Mr. Bell Davies to the Mysore Gold Mining Company, who, in stating that the lodes are true fissure veins, strongly urges the advisability of sinking to a depth of at least 150 ft. before proceeding to crush on a large scale. The directors wish the shareholders to bear in mind that this first or experimental treatment of 100 tons is not expected to inaugurate continuous crushing, as a much larger amount of underground work must be done before a sufficient supply of stone can be raised, even to keep the smaller stamps continuously employed. The directors, jointly with several other companies, have entered into an arrangement with a qualified English surgeon to reside on the fields, and afford medical aid to the employees of the company. Hitherto the health of the staff has been uniformly good. In conclusion, the directors wish to express their undiminished confidence in the success of the company.

**OPAL IN CENTRAL AUSTRALIA.**—At a meeting of the Chemical Section of the Philosophical Society of Glasgow on Monday—Mr. Tatloch, F.C.S., in the chair—Dr. James Robertson read a paper on the occurrence of opal in Central Australia. The lecturer, who has only recently returned from a visit to the colony, referred in detail to its geological and physical aspects, so far as they had come under his observation, and adverted in particular to the occurrence of opal in the Aladdin hills. He exhibited a large number of specimens of the opal that he had brought with him, and he expressed the opinion that the play of colour on the opaline mass was attributable to the presence of small cracks or fissures on the surface of the opal. He predicted that in future Australian opal would be more heard of, and

that should the gem become as popular as from the beauty of its hues it deserved the lonely wilds of Central Australia would be the scene of an industry as lucrative as it was novel. The lecture was much appreciated by an audience which included many members of the Geological Society of Glasgow.

The Stock Exchange Committee have appointed Tuesday a special settling day in the following securities:—Akankoo (Gold Coast) Mining Company (Limited) shares; Rhymney Iron Company (Limited), 73,062 5s. shares, with 3½. 10s. paid. All the above to be marked. The committee have also ordered the following securities to be officially quoted:—Rhymney Iron Company (Limited), paid old shares, to be marked as 126,338 5s. shares fully-paid, in lieu of the present quotation; Cape of Good Hope Diamond Mining Company (Limited) shares; Wentworth Gold Mining and Indian Estates Company (Limited) shares; Rio Tinto Company (Limited) 100,000 10s. fully-paid shares to be added to those already in the list.

**HAWKINS HILL CONSOLIDATED GOLD MINING COMPANY.**—Sir W. H. Drake, K.C.B., and Mr. R. W. Hoskins-Giddy have retired from the board of this company.

**HOLLOWAY'S PILLS.**—In general debility, nervous excitation, and mental depression, these unrivalled pills have a marvellous effect. They have won the confidence of millions in all parts of the civilised world. Constitutions shaken by sensual excesses, by long residence in unwholesome climates, by sedentary habits, overwork, worry, or anxiety, are wonderfully renovated by a course of this extraordinary medicine, which, powerful as is its action on the whole system, is perfectly harmless to the tenderest frame. The pills are composed of rare and selected balsams, without the admixture of any mineral whatever, or other deleterious substance. They operate directly, powerfully, and beneficially upon the whole mass of blood. The most sceptical cannot question the fact when we see indigestion cured, liver complaints arrested, the oppressed lungs brought into healthy play, and every physical function renewed and strengthened by their agency.

ESTABLISHED 1852.

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Cast Steel, Shear, Blister, Spring, Hammer, and Pick Steel.

Special Rock Drill Steel.

Mining Tools, Files, Saws, Hammers, and Picks.

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GOLD MEDAL AWARDED, PARIS EXHIBITION 1878.

## THOMAS TURTON AND SONS,

MANUFACTURERS OF

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MINING TOOLS &amp; FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS, LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

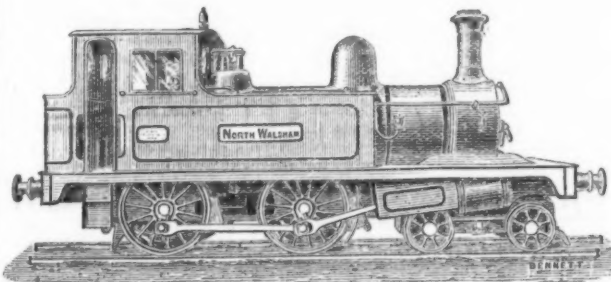
### SHEAF WORKS & SPRING WORKS, SHEFFIELD.

LONDON OFFICES—90, CANNON STREET, E.C.

PARIS DEPOT—12, RUE DES ARCHIVES.

BOSTON MASS., U.S.—40, KILBY STREET.

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## The Only Knapping Motion Stone Breaker and Ore Crusher.

AWARDED THE ONLY SILVER MEDAL FOR MECHANICAL EXHIBITS

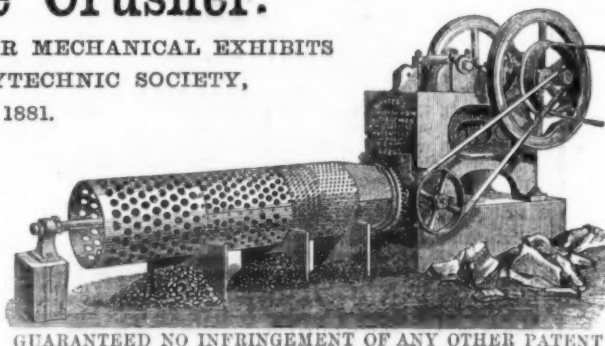
AT THE ROYAL CORNWALL POLYTECHNIC SOCIETY,

FALMOUTH, SEPT., 1881.

READ THIS—

The Bold Venture Lime and Stone Co., Peak Forest,  
Messrs. W. H. Baxter and Co., June 8, 1881.

GENTLEMEN.—We have the pleasure to inform you that the 20 by 9 Stone Breaker supplied by you is now working to our entire satisfaction, and we are now able to fulfil our contract with ease, which we had much difficulty in doing before with the Blake Machine. It takes less power and turns out considerably more stone.

Yours truly,  
BOLD VENTURE LIME AND STONE COMPANY.

GUARANTEED NO INFRINGEMENT OF ANY OTHER PATENT

These Machines turn out the same amount of work with less than half the power, and make a better sample of Road Metal, with 50 per cent. less waste, than any other machinery, and for Crushing Purposes they are still more advantageous, as the sudden action entirely dispenses with the clogging when used for crushing softer materials, and thereby saves many breakages and a great waste of power. There is also a saving of fully 75 per cent. of lubrication required over the Blake Machine, and as a proof of this, our driving shaft never becomes heated. We are also prepared to guarantee our driving shaft from breakage in any of our Knapping Motion Stone Breakers.

We have already supplied our Machines to Derby, Harrogate, and Falmouth Local Authorities; besides several Quarry Owners, Contractors, Plaster Manufacturers, &c.

FOR FULL PARTICULARS ADDRESS TO THE PATENTEES AND SOLE MAKERS,

## W. H. BAXTER & CO., ALBION STREET, LEEDS.

SOLE AGENTS FOR LONDON AND DISTRICT—

THOMAS GREEN AND SON (LIMITED), ENGINEERS, BLACKFRIARS ROAD, LONDON, S.E.



THE DYNAMO-ELECTRIC MACHINE SUPERSEDES EVERY KNOWN BATTERY.

# WILLIAM ELMORE,

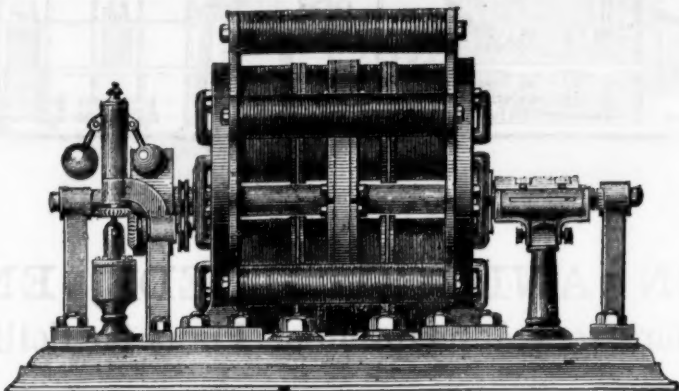
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NO AGENTS.

PRICES AND  
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APPLICATION.

ALL APPLICATIONS  
SHOULD STATE  
THE PURPOSE  
FOR WHICH THE  
MACHINE IS REQUIRED.



### The "Elmore" Patent Dynamo-Electric Machine,

FOR DEPOSITING

NICKEL, SILVER, BRASS, BRONZE, COPPER, ETC., AND FOR ELECTROTYPING.

REPEATED COMPARATIVE TRIALS have proved that this is the MOST POWERFUL MACHINE IN THE MARKET, that it NEVER REVERSES CURRENT, and that it is very easily worked without special knowledge.

COMPLETE OUTFITS OR MATERIALS FOR NICKEL-PLATING, SILVER-PLATING, ELECTROTYPING, TINNING, BRONZING, &amp;c.

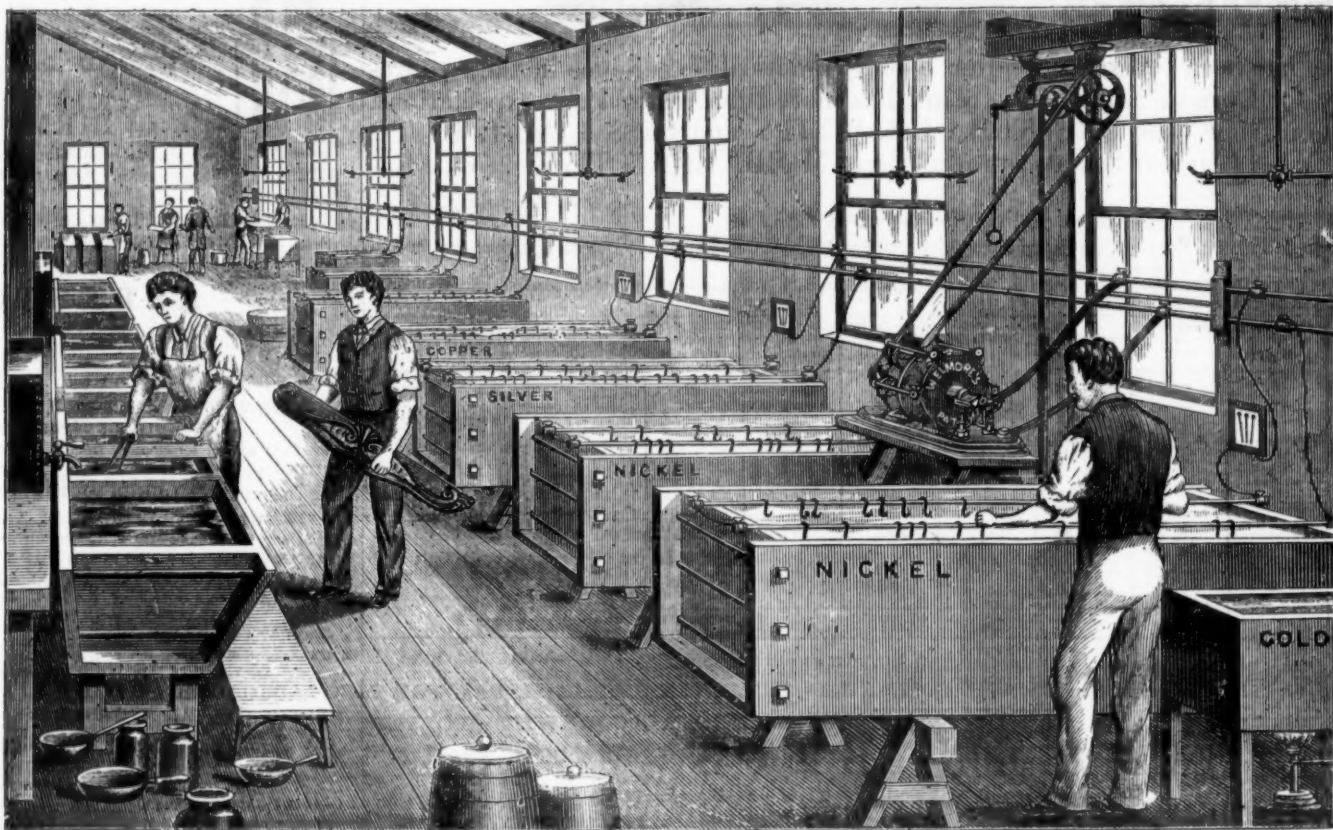
### TO TIN-PLATE MANUFACTURERS AND GALVANIZERS.

The attention of TIN-PLATE MANUFACTURERS AND GALVANIZERS is respectfully directed to the NEW PROCESSES of manufacturing Tin-Plates by depositing the Metal by the current of an "ELMORE'S PATENT" DYNAMO-ELECTRIC MACHINE through aqueous solutions in contradistinction to the old processes of dipping in molten metal.

THE ELECTRO DEPOSITED METAL IS PERFECTLY REGULAR IN character, and the electric current may be so EASILY CONTROLLED as to coat with a MERE FILM OF METAL, OR A DEPOSIT OF ANY DESIRED THICKNESS. The great economy in the cost of plant and cost of production will be immediately self-evident. As nearly the whole of the existing plant can be used in the new process, the cost of altering the system will be comparatively trifling.

DYNAMO-ELECTRIC MACHINES

SPECIALLY CONSTRUCTED FOR DEPOSITING ANY METAL IN ANY QUANTITY.



The above represents an Electro-plating Works, in which an "ELMORE" PATENT DYNAMO-ELECTRIC MACHINE is being used for the deposition of Nickel, Silver, Copper, Bronze, Brass, Gold, Tin, Zinc, &c., from their Solutions.

#### From "INDUSTRY."

"By means of the dynamo-electric machine of Mr. William Elmore, the perfection of nickel-plating is obtained. Dynamo-electricity—that is, electricity produced by motive power—presents advantages which cannot be claimed by any galvanic battery known. Not only is the current produced at a far less cost, but it can be so regulated or controlled that the smallest article can be separately coated by a dynamo-electric machine, capable (in its full application) of depositing from 25 lbs. to 30 lbs. of silver per hour. It is a remarkable fact, moreover, that metals can be deposited from their solutions by dynamo-electricity in less than one-third of the time occupied by the ordinary battery in producing the same result. The quality of the deposit, in regard to its smoothness and regular character, is greatly in favour of dynamo-electricity.

"Having had considerable experience in dynamo-electric machines, Mr. W. Elmore has been careful to note the defects and irregularities which some of the less skillfully constructed machines have presented, and thus he has been enabled to produce a really practical and effective machine, of great power, which may be thoroughly depended upon as being capable of giving the most satisfactory results for all purposes of electro-deposition, including gilding, silvering, bracing, nickeling, and electrotyping.

"The advantages of dynamo-electricity in the important art of electrotyping are beyond estimation. When it is known that a fine, clear, deposit (or 'shell') of copper, 200 ft. square, can be obtained by a dynamo-machine in less than three hours, without 'pin-holes,' and other defects common to battery deposits, it will be at once seen that the ordinary battery is effectually and unmistakably superseded.

"One of the most useful purposes to which dynamo-electricity can be applied is the production of chemically pure nickel solutions, and salts of nickel, for the electro-deposition of the metal. The vast amount of elec-

tricity generated in a dynamo-machine enables one to dissolve nickel and other metals in their own solvents, far more economically, and in greater purity than by the ordinary method of treating metals. Electrical power obtained by the ordinary galvanic battery would be far too expensive for this purpose. The solutions formed by the aid of dynamo-electricity are not only purely and economically made; but they can be produced in far less time, and with comparatively little trouble and attention. To Mr. Elmore is due the honour of having introduced into this country the process of making pure nickel solutions and salts by means of dynamo-electricity. The boon he has thus conferred upon a large industrial class we need not dilate upon."

#### From "THE IRONMONGER."

"A still further improvement in the deposition of metals has been recently obtained by the introduction of the dynamo-electric machine of Mr. Wm. Elmore, which is in reality electricity produced by motive power. By this means the current is obtained at a much less cost, and I have seen it regulated to such a nicety that the smallest article could be separately coated in a full-sized vat. The deposit is also effected in about one-third of the time taken by a galvanic battery, and for smoothness and regularity of surface is greatly in favour of the dynamo process, which may be known from the fact that all Mr. Elmore's competitors, both in London and elsewhere, are fast adopting his machine in preference to the old process. He has, in addition, supplied it to many large firms throughout the country for electrotyping purposes, and the reports received from them are gratifying to the inventor. Mr. Elmore is also the author of an interesting little work on the subject, which may be read with interest by those who contemplate entering into what is fast becoming an important industry."

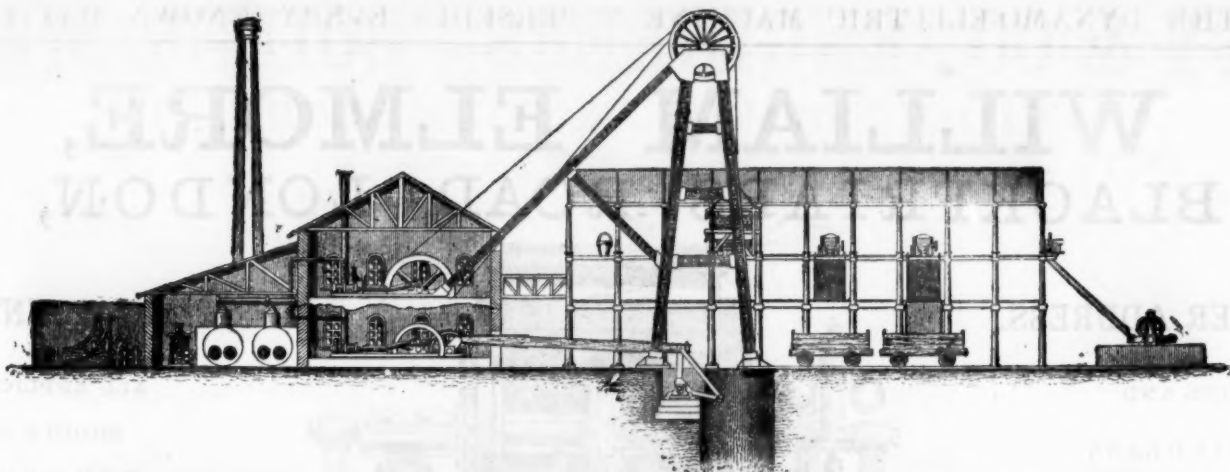
## WILLIAM ELMORE, 91, BLACKFRIARS ROAD, LONDON, S.E.

DYNAMO-ELECTRIC MACHINES FOR ELECTRIC LIGHTING.

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WINDING, HAULING, AND PUMPING ENGINES; AIR COMPRESSORS; DIRECT-ACTING STEAM PUMPS; VENTILATING FANS; SEMI-PORTABLE BOILERS AND ENGINES COMBINED; PIT-HEAD PULLEYS; WIRE ROPES; WROUGHT-IRON HEAD GEAR, CAGES, and SCREENS; BOILERS PATENT DETACHING HOOKS; COAL WASHING MACHINES; STEAM HAMMERS; STEAM CAPSTANS; PUMPS; VALVES. PATENT BRIQUETTE MACHINES (for Compressed Fuel).

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PATENT BRICK MACHINES for DRY, SEMI-DRY, and PLASTIC CLAY; WET and PERFORATED CLAY GRINDING PANS; CLAY ROLLS PUG MILLS; MORTAR MILLS; FRICTION HOISTS; PIPE-MAKING MACHINES; BRICK PRESSES; PATENT KILNS.

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N.B.—Experienced workmen sent out, if required, to Erect or Manage. Considerable Saving in Prices by dealing direct with us, having for many years been chiefly engaged in the manufacture of Colliery, Mining, and Brickmaking Plants.

McCullochs & Holman Bros  
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**"CORNISH" ROCK DRILL.**  
1<sup>ST</sup> SILVER MEDAL.  
MINING INSTITUTE OF CORNWALL 1881.

This machine has been constructed after a long practical experience in the requirements necessary for Cornish mines. The result has more than realised our expectations. Our chief objects in view were GREATER DURABILITY and LESS LIABILITY TO DISARRANGEMENT, but it has also proved itself MORE EFFECTIVE. (Vide Report.)

MINING INSTITUTE OF CORNWALL.

CAMBORNE, 8TH DECEMBER, 1881.

Sir,—Having been requested by the Council to superintend the Rock Drilling Machine Contest, held at Dolcoath Mine to-day in connection with the above Institute, I beg to hand you the following report:—

The competing machines were the "Barrow," the "Cornish," and the "Eclipse"—each was fixed on the same mounting bar, and bored into the same stone. The result of the boring were as follows:—

Name of Machine.	Diameter of cylinder.	Diameter of Drill.	Time boring.	Depth bored.	Cubic inches of ground cut.	Cubic inches cut per minute.	Mean pressure per square inch.	Remarks.
Cornish.....	In. 3½	In. 2	Min. Sec. 1 15	In. 4½	14.1	—	—	
".....	—	1½	55	9	21.6	—	—	
Total.....	3½	—	2 10	13½	35.7	16.4	61	
Eclipse.....	3½	2	40	—	—	—	—	} Ran into Cornish hole; hole not properly watered.
" second try.....	—	—	2 0	1	3.1	—	—	
" third try.....	3½	2	2 35	11½	35.3	13.6	60	
Barrow.....	4	1½	15	½	1.2	—	—	Gland to mounting bar broke.
".....	—	—	2 0	8½	19.18	—	—	
Total.....	4	1½	2 15	8½	21.0	9.3	60	

To R. H. Williams, Esq., C.E., President of the Mining Institute of Cornwall.

JAMES HOSKING, M.E.

**HOLMAN BROS.,**

CAMBORNE FOUNDRY AND ENGINE-WORKS, CAMBORNE, CORNWALL.

**JOHN MARSDEN,**

MANUFACTURER OF

**Air Tubing and Improved Brattice Cloth,**

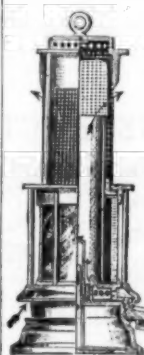
Tarred, Oiled, and Non-Inflammable.

THE OILED CLOTH IS ESPECIALLY RECOMMENDED FOR DAMP MINES, AND IS ALSO A GOOD COVERING FOR SHEDS.  
THE NON-INFLAMMABLE FOR THE MORE DANGEROUS MINES.

Samples and prices free, on application at the Works,

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ALSO MANUFACTURER OF PACKING FOR ENGINES, PUMPS, &c., and STEAM HAMMER RINGS.



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**SAFETY LAMP**

AND  
GAUZE MANUFACTORY.

Honourable Mention, Paris Exhibition, 1878.

Illustrated Price Lists free, by post or otherwise.

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Belmont Passage, 203, Lawley-street,

**BIRMINGHAM.**

Makers of Williamson's Double Safety Lamp, Williamson's Patent Double Safety Lamp shown half in section.

Medal—For Improved Invention—London, Kensington, 1874.

Ditto—Excellence of Workmanship—Wrexham, 1876.

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**RAILWAY PASSENGERS ASSURANCE COMPANY**  
The oldest and largest Company, insuring against Accidents of all kinds.  
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SUBSCRIBED CAPITAL ... .. £1,000,000

PAID-UP CAPITAL AND RESERVE ... .. £240,000.

MODERATE PREMIUMS.

BONUS ALLOWED TO INSURERS AFTER FIVE YEARS.

£1,700,000

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Apply to the Clerks at the Railway Stations, the Local Agents, or

64, CORNHILL,

Or 8, Grand Hotel Buildings, Charing Cross, London.

WILLIAM J. VIAN, Secretary.

MINING ENGINEER.

**ALEX. DEL MAR,**

Mining Engineer, late Director of the United States Bureau of Statistics, Mining Commissioner for the United States Monetary Commission, &c., 216, SANSOME STREET, SAN FRANCISCO: Cable address—"Delmar, San Francisco." Branch Office, 61, Broadway, New York: Cable address—"Delmar, New York." London Agency, H. Stopes and Co., 24A, Southwark-street, S.E.: Cable address—"Delmar, London." Paris Agency, J. H. McDonald and Co., 13, Rue St. Lazare: Cable address—"Delmar, Paris."

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509, MONTGOMERY STREET, SAN FRANCISCO, CAL.

J. JACKSON, Manager

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AN ELIGIBLE OPPORTUNITY is now offered for the SETTLEMENT of an ACTIVE YOUNG GENTLEMAN IN CANADA. He will be enabled to obtain his profession as a Solicitor in five, or if he be a Graduate in three years. Cost of living about £150. In the meantime he will have active work, and obtain a knowledge of the Dominion, which is destined to become one of the most prosperous of the Colonies. Premium, £100 sterling.  
HERBERT C. JONES,  
32, Wellington-street, Toronto Canada Land and Loan Agency.







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Hadfield's Sheet of Drawings, No. 28 B.

**HADFIELD'S STEEL FOUNDRY COMPANY.****ATTERCLIFFE, SHEFFIELD.****GOLD MEDAL.****GOLD MEDAL.**

Contractors to H. M. Home, India, and Colonial Governments;  
Home, Foreign, and Colonial Railways; Admiralty,  
War Department, &c.

Special Award, Paris, 1878.

Special Award, Melbourne, 1880.

FIRST PRIZES AT LEEDS AND MANCHESTER, 1875. FIRST PRIZES AT LEEDS AND CORNWALL, 1876.

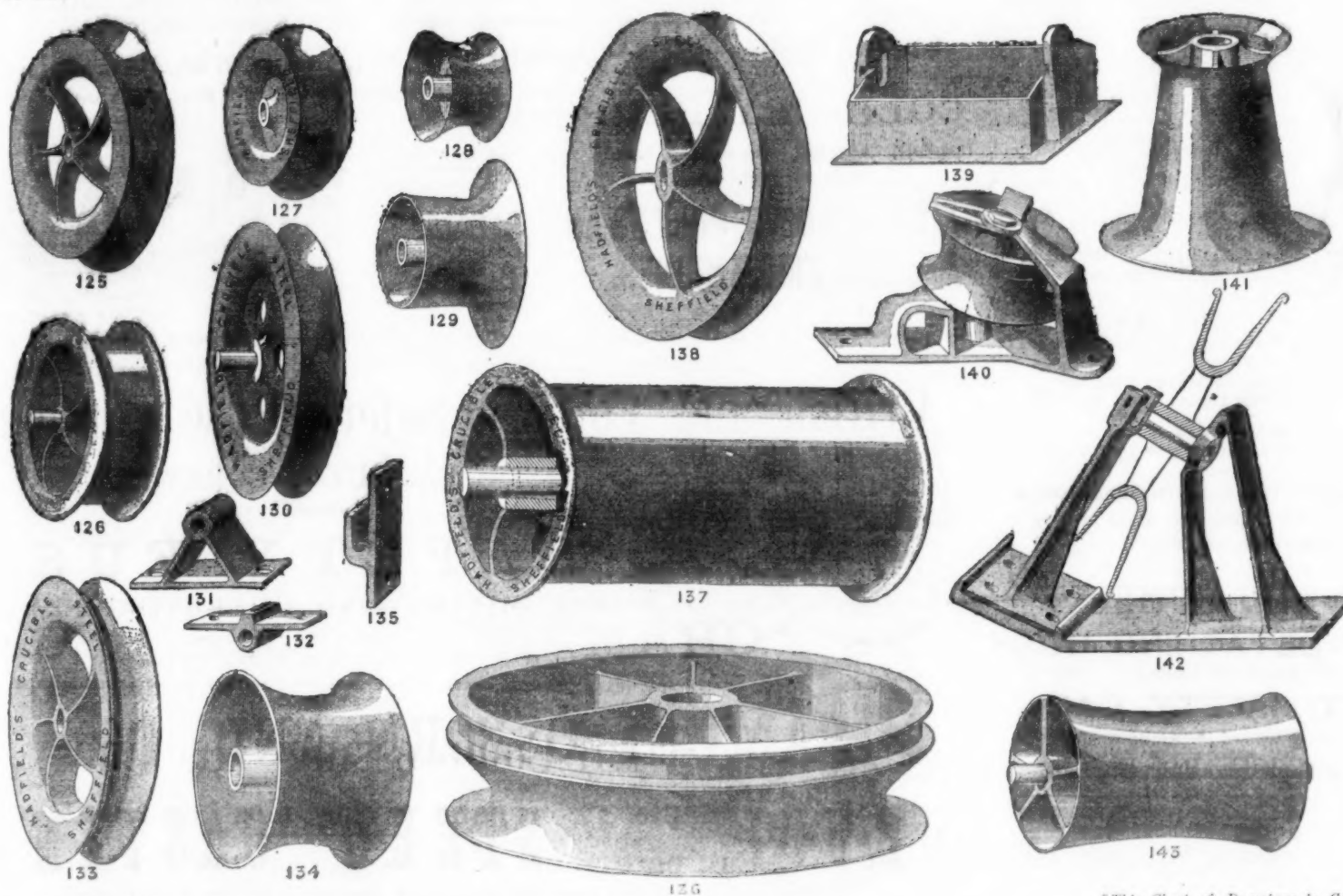
X SPECIAL AND HIGHEST AWARD AT SYDNEY, 1879, DIPLOMA &amp; MEDAL. X

**▷ HADFIELD'S CAST STEEL WHEELS. ◁**

One of our departments is specially adapted for the production of our Patent Steel Wheels and Axles for Collieries, Tramways, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., and we are now manufacturing 2000 per week. Owing to our patent system of fitting-up Wheels and Axles, which is simple but effective, we are enabled to execute orders with promptitude. We undertake to supply all work entrusted to us in a first-class manner, and only manufacture the BEST quality of material. Over 1100 DIFFERENT WHEEL, PULLEY, AND PEDESTAL PATTERNS IN STOCK, of varying widths of tread, flanges, &c., any of which can be ready for use at the shortest notice.

In addition to the now universally admitted superiority of Hadfield's Steel Wheels over those of Cast-iron for lightness, strength, and wearing qualities, we claim the following SPECIALITIES for our material over any other Steel, Malleable Iron, or other Wheels, viz.:

Extra TOUGHNESS or TENACITY, DURABILITY, and SOLIDITY; for proof of this kindly see advertisement marked "List No. 28."



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We also solicit attention to the following articles, which, in addition to our well-known Patent Steel Wheels and Axles, we are now largely supplying in our CAST STEEL, on account of their great strength, combined with durability and lightness.

**Rollers, Pulleys, Frames, and Stands.**—See our Lists of over 160 different patterns. They possess great durability, lightness, and strength, and add considerably to the life of the steel or other ropes.

**Self-oiling Wheels (Patent).**—Many thousands now at work. Save at least 50 per cent. of oil or grease. Easily charged or re-filled. Reduce friction and wear and tear to a minimum.

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Hadfield's Sheet of Drawings, No. 28 B.



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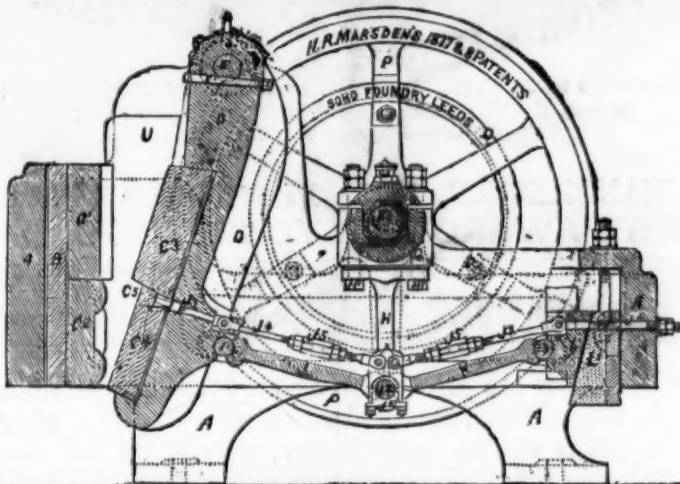
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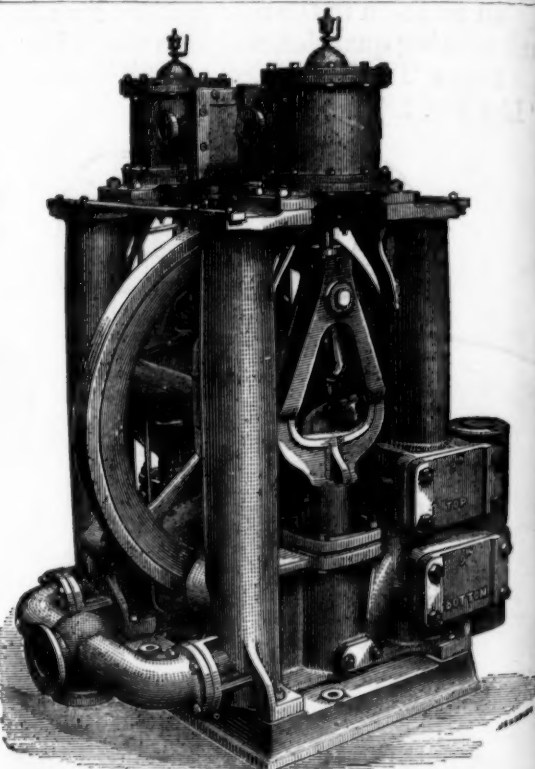
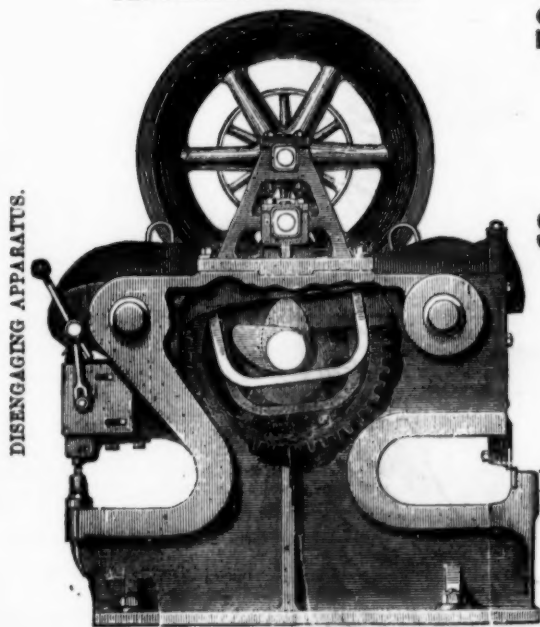
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